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ART. XX.—ON *EUONYMUS ATROPURPUREUS* ET AMERICANUS.

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(*An Inaugural Essay.*)

Nat. Ord. CELASTRACIÆ.

Sex. Syst. *Peptandria Monogynia*.

EUONYMUS. Sepals 4-5 (rarely 6,) united at the base, forming a short flat calyx. Petals 4-5 (rarely 6.) Stamens inserted on the upper surface of the broad and flat disk: filaments short, the base persistent: anthers with a thick connectivum at the back, opening transversely or longitudinally. Ovary immersed in the disk, with as many 2-3 ovuled cells as petals: styles united, short and thick: stigmas united into one, obtuse or lobed. Capsule 4-5-lobed, 4-5-celled, loculicidal. Seeds usually enclosed in a fleshy red or purple aril. Embryo with broad foliaceous cotyledons: albumen fleshy and oily. Shrubs, sometimes trailing or climbing by rootlets. Leaves opposite, serrate. Stipules mostly none. Peduncles axillary, 1, many-flowered: inflorescence cymose.—*Torrey & Gray, Flora N. Amer.*

EUONYMUS ATROPURPUREUS, (Jacq.) branches smooth:—leaves (rather large) oval or elliptical, oblong, acuminate, mostly acute at the base, finely serrate, on distinct petioles,

perverulent beneath; peduncles compressed, several-flowered: parts of the flower usually in fours: petals roundish, obovate: capsules smooth, deeply lobed.—*Jacq.*

Flowers June, July. Shrub 4-12 feet high; the branches slightly 4-sided. Leaves 2 to 5 inches long. Petals dark purple. Capsule crimson when mature. Seeds nearly white, invested with a bright red succulent aril.—*Torrey & Gray, Flor. N. Amer.*

Common Names. Burning-bush, Spindle-tree.

EUONYMUS AMERICANUS, (Linn.); Branches smooth, 4-sided; leaves varying from elliptical-lanceolate to oval obovate; on very short petioles: rather obscurely serrate, glabrous, peduncles 1-3-flowered: petals roundish-obovate: capsules depressed globose, verrucate-echinate.—*Willd.*

Flowers May to June. Branches slender, green. Leaves 1-2 inches long, coriaceous, nearly evergreen in the Southern States. Parts of the flower mostly in threes or fives. Segments of the calyx very short and roundish. Petals greenish-yellow, tinged with purple. Capsule deep crimson when mature, slightly angled, densely muricate or warty; the dissepiments and aril scarlet. Seeds smaller than in the preceding, 1-3 in each cell. Both species are very ornamental in autumn when the fruit is ripe.—*Torrey & Gray, Flor. N. Amer.*

Common Names. Strawberry-tree, Burning-bush.

The Wahoo Bark, the subject of the present paper, is derived from the preceding varieties of *Euonymus*. These shrubs are found throughout the United States and Canada, preferring rich soil and shady situations. In addition to the above name, which was conferred on these plants by the Indians, they have also received the title of the Indian Arrow Wood, from the straightness of their trunks. From Dr. S. W. Ripley, of Ohio, information concerning this bark, and the shrub affording it has been received; and in the locality in which he found it, it usually occurred in low grounds in the vicinity of creeks, and never attained

a height of more than twelve feet. I have, however, been informed that in Kentucky its height sometimes exceeds twenty feet.

It has been stated that the bark derived from the root is more highly charged with medicinal properties, except when the plant is in full vegetation, when that from the twigs is more efficient.

The bark of the trunk and branches has alone been examined by the writer. This is in pieces from four to ten inches in length, a half to two lines in thickness, partly or perfectly quilled, and covered with an ash-coloured epidermis, which is corrugated in some instances, sometimes quite smooth, and in other specimens having a verrucose structure. Internally it is usually white, but not unfrequently has a yellow hue.

The fracture is splintery, and on account of its ligneous fibrous nature, it does not readily yield to the action of the pestle.

Chemical Examination.

Various experiments were pursued with this bark with a view of isolating any active principle present therein, and the following one only accompanied with satisfactory indications. A strong decoction was prepared, the gum, colouring principle, &c., precipitated by subacetate of lead, and the excess of lead removed by hydrosulphuric acid. The clear liquor possessed the bitter taste of the bark. It had an acid reaction, which, it is presumed, arose from acetic acid resulting from the decomposition of the acetate of lead. A solution of tannic acid produced a precipitate. Placed in a capsule on a sand bath, and evaporated, a brownish adhesive substance, soluble in ether, alcohol and water, remained. The taste of the latter is bitter at first, afterwards acid and persistent.

Other experiments induce the impression that future researches may produce successful results.

With iodine the decoction of the bark afforded no evidence of starch.

Subacetate of lead caused a copious deposit, thus evidencing gum.

The infusion of galls produced an abundant precipitate. The infusion behaved in like manner with the several reagents, and with nitrate of silver and bichloride of mercury, the presence of vegetable albumen was shown.

The tincture, prepared with alcohol 35° Baumé, was of a beautiful yellow colour. The addition of water rendered it turbid. No change was produced by it on litmus paper, or on the same reddened. Exposed to heat, a reddish resin and greenish fixed oil remained. One ounce of the bark was exhausted by displacement with eight fluid ounces of diluted alcohol. A clear tincture of a reddish colour was afforded, which possessed in a great degree the bitterness of the bark. Five fluid ounces yielded on evaporation twelve grains of a brownish-red resinous extract apparently rich in the properties of this article.

The ethereal tincture, which was of a greenish-yellow colour, on being exposed to heat, afforded the oil and resin obtained by the alcoholic treatment. On an adult, two grains of the latter produced a cathartic effect.

A portion of the bark was subjected to distillation, and the product found impregnated with its peculiar odour. On the surface greasy spots were observed; the sides of the receiver somewhat oily, and moreover the liquid slightly milky.

From these and other indications, there is little doubt that a volatile oil exists in small amount. The ashes were examined, and potash, lime and iron recognized by their appropriate tests.

The important medical properties of a diuretic, tonic, antiperiodic, and hydragogue cathartic, have been ascribed to this bark, but its beneficial effects in the different forms of dropsy, have given it celebrity and procured its introduc-

tion as a medicine. It is usually employed in the forms of decoction and infusion. As a diuretic, these preparations are generally made in the proportion of an ounce to a pint of water, and administered in doses of a wineglass full. For exhibition as a tonic, two drachms to the same quantity of water, and given in like doses.

In closing, it may be remarked, that on account of the importance of this indigenous medicinal agent, it merits and will receive further examination. By some western practitioners it is much used, and regarded as an efficient medicine. If such be indeed the case, it is hoped that its employment will be more general, and that ere long it will be added to the list of efficient remedies.

ART. XXI.—PHARMACEUTICAL NOTICES.

By WILLIAM PROCTER, JR.

Fluid Extract of Buchu. Buchu leaves contain, according to Cadet de Gassicourt, *volatile oil, resin, chlorophylle*, extractive and twenty-one per cent of gummy mucilage, soluble partly in cold, but wholly in boiling water, and communicating to that fluid by ebullition, a considerable ropiness which is manifest in the officinal infusion.

As a remedy in diseases of the bladder, it is held in much esteem by some physicians, and as its use requires to be continued for a length of time, it has been thought; that a preparation embodying all the medical virtues of the drug, so concentrated as to require but a small dose, and yet sufficiently permanent to be kept for a length of time, would be a desideratum.

The following formula, which is very easy of execution, is proposed, viz :

Take of Buchu leaves,	-	8 ounces, (Troy.)
Alcohol,	- -	16 fluid ounces,
Water,	- -	a sufficient quantity.

Reduce the leaves to coarse powder, moisten them in a covered vessel, with twelve fluid ounces of the alcohol, macerate them for six hours, and introduce the whole into a suitable displacer. When the clear fluid has ceased to drip, add the remaining alcohol mixed with four fluid ounces of water, gradually, until the displaced alcoholic liquid amounts to twelve fluid ounces, which is set aside until reduced to six fluid ounces by spontaneous evaporation. The residue in the displacer is then treated with a pint of cold water, by maceration for twelve hours, and subjected to pressure until a pint of aqueous liquid is obtained. (Displacement may be resorted to, but the mucilage renders it ineligible.) This is evaporated to ten fluid ounces, mixed with the six fluid ounces of evaporated tincture, and after occasional agitation for several days may be filtered or strained, to remove the undissolved resinous and gummy matter.

Thus prepared, it had a dark brown colour, a strong and rather purgent taste of Buchu, and is administered in doses of one or two teaspoonfuls, which represents half a dram to a dram of the leaves.

I have prepared this fluid extract by evaporating the tincture to four fluid ounces, the infusion to eight fluid ounces, and then dissolving in the mixture eight ounces of powdered sugar by agitation.

Dr. M. Clymer, who has used this preparation, and approves of it, prefers the first formula to the last, as he finds the patients to whom it was administered had a disinclination for sweet drinks.

Fluid Extract of Taraxacum. Under the name of "Liquor Taraxaci," a fluid preparation of dandelion has

been used for some years past in England, and is justly esteemed.

The following formula, which differs in some respects from the English, I believe to yield an excellent preparation.

Take thirty-two ounces of fresh dandelion root, collected in September or October, slice it transversely, and reduce to a pulp by bruising. Mix this with one-sixth of its bulk of alcohol; macerate for twenty-four hours, then express strongly. Add a pint of water, containing a little alcohol, and again express. Evaporate the liquid to twelve fluid ounces; add four fluid ounces of alcohol, and filter. A teaspoonful of this fluid extract represents half a dram of extract of dandelion, obtained from the expressed juice, which is several times the strength of that obtained by boiling the root in water, as directed by the Pharmacopœia.

If alcohol should be objectionable in certain cases, eight ounces of sugar may replace it in the above formula, it being dissolved by agitation.

As it is always attended with inconvenience, to make such preparations at only one season of the year, the fluid extract may be made from sixteen ounces of the dried root that has been collected as above, reduced to coarse powder, macerated in two pints of water mixed with half a pint of alcohol, for two days expressed, &c., as in the other case.

Extractum Spigeliæ et Sennæ. Fluid Extract of Pinkroot and Senna. A preparation of this character is not new, as a fluid compound, analogous in its medical ingredients to the ordinary "worm tea," was published several years since in this Journal, by Thomas Eastlack, Jr.

The preparation now proposed, was in use before the publication of the above noticed formula, and has continued ever since to be employed by physicians, and in domestic practice, with satisfactory results. Its permanence, and the readiness with which children take it, are additional motives for its employment.

Take of Pink root, - - -	(Av.) 16 ounces.
Senna, - - -	8 ounces.
Powdered sugar, - -	24 ounces.
Carbonate of potassa, - -	1 ounce.
Oil of Caraway,	
Oil of Anise, of each	half a dram.
Diluted alcohol,	a sufficient quantity.

The pink root and senna are reduced to coarse powder, mixed with two pints of diluted alcohol, and macerated for two days. The mixture is then placed in a displacer, and more diluted alcohol gradually added, until five pints of tincture have passed, observing that the liquid passes slowly and regularly. This is evaporated in a water bath to twenty fluid ounces, and the carbonate of potassa added and mixed, which dissolves the resinous and extractive sediment. The volatile oils are now triturated with a portion of the sugar, and then with the rest, and the whole mixed with the evaporated liquid, and by means of a very gentle heat cause the solution of the sugar. The whole should measure, when completed, two pints.

The carbonate of potassa, not only gives solubility to the matters deposited by the evaporation of the alcohol, and corrects the griping tendency of the senna, in part, but itself, in the opinion of some, possesses anthelmintic power. The relation of the two chief ingredients is that in which they are most usually prescribed.

The dose varies from half a teaspoonful to a child of one or two years, to a tablespoonful for an adult.

Tincture of Aconite root. The concentrated tincture of aconite root, proposed by Dr. Turnbull, of Edinburgh, as a substitute for the more expensive active principle, *aconitia*, is an efficient preparation, if well made. Dr. Turnbull's formula directs that a pound of the root, properly divided, should be treated with a pound and a half of alcohol, expressed and filtered. The observations of M. Personne, on

a variety of drugs, has proven that a certain amount of menstruum is absolutely necessary to exhaust them, and this varies from four to five times their weight ; consequently the formula of Dr. T. does not exhaust the root. The following mode of treatment will yield a tincture possessed of all the active parts of the quantity of root named :

Take of Aconite root in powder, 16 oz., (Troy.)

Alcohol, (sp. gr. .835) a sufficient quantity.

Mix the powder with a pint and a half of the alcohol, and allow it to macerate for forty-eight hours, introduce the mixture into a displacer, cover the surface with a piece of filtering paper, and return the fluid until it passes clear, then add alcohol in small portions at a time, suffering each to disappear before the next is added, until the amount displaced measures four pints. This is then reduced by evaporation or distillation, to two pints, when the tincture should be filtered if necessary, and is then complete.

Glycerin, as a remedy in cutaneous diseases, and as applied in certain processes of pharmacy. The sweet principle eliminated from the fixed oils in the process of saponification, has recently attracted some attention from the observations of J. Startin, Esq., Surgeon to the London cutaneous institution, (Med. Times, Aug. 7, 1847,) and (Braithwaite's Retrospect, part 16, page 226.)

Glycerin was discovered by Scheele. Chevreul first recognized its importance and extensive existence in nature, and in conjunction with Pelouze, has given the exact nature of this body. It exists naturally combined with various oily acids, giving rise to the respective neutral oily principles, stearin, olein, &c. It is, when perfectly pure, a colourless syrupy liquid, without odour ; a decided sweet taste, and has the sp. gr. 1.25 to 1.27. It dissolves in water and alcohol in all proportions, but is insoluble in ether. It is slightly volatilized when boiled with water, but is destroyed by distillation, *per se*, yielding acrolein, the acrid principle of burnt fats, and itself burns with a luminous flame. It combines

with sulphuric acid, and also with potash and baryta. Its solvent powers are very extensive, dissolving amongst other substances, oxide of lead, all the deliquescent salts, sulphates of potassa, soda and copper, nitrate of silver, nitrate of potassa, &c.

Glycerin is most easily obtained by the saponification of olive oil in making lead plaster. The water in which the plaster is malaxated, abstracts the glycerin, holding in solution a little oxide of lead. The solution is evaporated till reduced to a very thin, syrupy consistence; sulphuretted hydrogen passed through it to separate the lead, the solution then heated to remove the excess of gas, and evaporated at a temperature of 150° Fahr. till it ceases to lose weight. It yet contains water which may be removed by placing it in a vacuum, over sulphuric acid. As thus obtained, it will be more or less straw coloured, but is sufficiently pure for medical purposes. Large quantities of glycerin are thrown away in the residual saline liquid, in the manufacture of soap. It may be obtained from this by neutralizing the free alkali with sulphuric acid; evaporating to a syrup, and treating the syrupy saline residue with concentrated alcohol, which dissolves the glycerin, and leaves the sulphates. The product requires to be treated with charcoal, to decolorize it, and is less likely to be pure, than that obtained from lead plaster.

Dr. Startin makes the following remarks in reference to the medical and physical properties of this agent, viz :

“The antiseptic and undrying properties of glycerin, first led me to attempt its use for medical purposes, as I believed by means of such properties, lotions, poultices, baths, &c., might be rendered peculiarly emollient and soothing, when preternatural dryness, roughness, or harshness of the skin was present, and particularly in those cases where the hair or scalp was involved, as in instances of dandriff or pityriasis of these parts; my expectations were more than realized by reducing my conjectures to practice, and I found that by

the addition of one-fourth to one-eighth, or even one sixteenth of glycerin, to any lotion, poultice, or external application, all the indications I have mentioned were fulfilled, and that such application never became perfectly hard and dry, whilst it soothed and tranquillized the diseased part, by attracting moisture from the air, and thus keeping up a constant evaporation from the surface; its antiseptic properties, also, in great degree, prevented the unpleasant odour of vitiated secretions or discharges, whilst its undrying nature, did not permit the formation of hard scabs or incrustations, which, it is well known, very often interfere with the healing process, and occasion much pain on their removal. I have had little experience in the use of glycerin internally, but it is a mild stimulant, antiseptic, and demulcent, and might be employed to sweeten many articles of food or drinks, for those invalids whose disordered digestive organs would forbid the use of sugar. Pills made with the addition of a few drops of glycerin never become dry, and syrups and extract by its means, are kept from evaporation to dryness, as also from fermentation, and the formation of cryptogamic vegetation or mouldiness, and many other such uses for this agent, will not fail to suggest themselves. I shall briefly enumerate some diseases of the skin, in which I have employed glycerin with most benefit and success. These are pityriasis or dandriff, (particularly that form of the disease which I have termed *P. congenita*,) lepra, *psoriasis*, lichen (in its dry, advanced stage,) impetigo inveterata, and prurigo. I have found glycerin, also, a useful addition to lotions in the incrustated form of lupus or herpes excedens, and to various syphilitic or strumous eruptions, which have a tendency to produce fetid discharges, and hard crusts; for which reason it has proved of service in the scabbing stage of small-pox. As a wash for the hair, or for chapped hands, face, or nipples, combined with a little rose water, and a few grains of the borax, (the glycerin being in the proportion of 1-16th,) this remedy furnishes, per-

haps, one of the most elegant and efficacious preparations which has been introduced. It may also be combined with soaps, which it renders peculiarly softening and efficient, particularly to individuals who have a dry or hard skin."

The antiseptic, softening properties, as stated by Dr. S., will render this a useful agent in pharmacy, independent of its medical relation, if borne out in practice. In blue pill, quinine pills, and many others where hardening is to be avoided, and where water would cause mouldiness in close vessels, this agent is said to answer without this change. Dr. Clymer, who prescribed the following mixture in a case of lichen, found it perfectly successful.

Take of glycerin,	-	-	-	-	f.3j.
Borax,	-	-	-	-	grs. x.
Rose water,	-	-	-	-	f.3vij
Make a lotion,					mix.

This lotion was applied three times a day. Its efficacy in chapped hands has been proven in two cases under my own notice.

ART. XXII.—ON THE PREPARATION OF CHLOROFORM.

BY M. SOUBEIRAN.

THE following is the process which I now employ for preparing this substance, the publication of which, although perhaps somewhat premature, I shall not regret, if it may have assisted in admitting some destitute sick to an earlier participation in the beneficial effects derived from anesthesia by chloroform.

I take 10 parts of commercial chloride of lime of about 90°, mix it carefully with 60 parts of water, transfer the lime-milk which results into a copper still, which should not be filled more than two-thirds, add 2 parts of alcohol of 0.85, and adapt the head and the receiver; when the joints have been well-cemented, a brisk fire is kept under the apparatus. At about 176°, a violent reaction ensues, which raises the mass and would cause it to pass into the receiver if the fire were not quickly removed; this is the only difficult part of the operation. Its approach is indicated by the temperature of the neck of the still. When this has become much heated at its most distant end, before any products of distillation have begun to appear the firing is removed. A few moments afterwards distillation begins, and proceeds rapidly of itself until almost complete. As soon as I observe the action to become slow, I restore the firing to assist it. It is very soon terminated, which is easily known from the liquids which pass over no longer possessing the sweet taste of chloroform. The distillate is composed of two strata; the lower one is dense and slightly yellowish; it consists of chloroform mixed with alcohol and contaminated with a little chlorine; the upper stratum is a mixture of water, alcohol and chloroform, and in the course of twenty-four hours deposits a quantity of the latter product.

The chloroform is separated by decantation, agitated with water to wash it, and then with a weak solution of carbonate of soda to remove the chlorine; it is then rectified over chloride of calcium in the water-bath. For medical purposes I have considered it quite superfluous to admit it to a further rectification over sulphuric acid. The upper stratum of the product from the distillation, and the waters used in washing are united, diluted with more water, and distilled in the water-bath. The chloroform soon passes over, carrying with it a little water and spirit. It is purified as above described.

The principal difficulty in the preparation of chloroform is the necessity of working with very dilute chloride of lime, from fear of other bodies originating, especially of acetic products, which it would be almost impossible to separate. Hence the necessity of operating in vessels of large dimensions, although working with very small quantities of alcohol. It must moreover be remembered that chloroform appears to be only a secondary product. In the violent reaction which ensues between the hypochlorite of lime and alcohol, there is always much less obtained than theory would lead us to expect. Fortunately each operation occupies but little time, and several distillations may be made one after the other in the course of a day.

My first efforts were restricted to determine the most advantageous proportions of chloride of lime, water and alcohol. I have likewise made some experiments to ascertain the influence of a longer or shorter contact, and I am induced to think that the operation is the more productive the quicker it is effected. I believe that it is very advantageous to mix the pulverized chloride of lime in hot water, in order that it may more rapidly attain the temperature of 176° , requisite for the production of chloroform.

A great deal of the chloroform sold at first was not sufficiently pure. I may observe, that notwithstanding its apparent fluidity it is very heavy, and this furnishes a ready

method of ascertaining its purity. By mixing equal parts of concentrated sulphuric acid and distilled water, a liquid is obtained, which, on cooling, indicates 40° on the areometer (spec. grav. 1.35.) One drop of chloroform poured into this liquid sinks to the bottom. This is a very simple test and easily practised, which I hope will prevent the sale of chloroform mixed with alcohol.—*Chem. Gaz. from Comptes Rendus.*

ART. XXIII.—ON CHLOROFORM.

BY THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

M. MIALHE, in a communication recently made to the Academy of Sciences of Paris, states as the result of his researches :—

“1. That pure chloroform, applied to the skin or mucous membrane, produces simple redness without cauterization or vesication. It acquires, however, the caustic properties when mixed with a small quantity of absolute alcohol.

“2. That the chloroform used in medical practice which has caused vesication of the lips or nostril, with irritation of the bronchial tubes, could not have been pure.

“3. That this chloroform contains a certain quantity of anhydrous alcohol. The presence of this liquid in chloroform was suspected by MM. Soubeiran and Gerdy, and it has been demonstrated by analysis. The alcohol may act by combining with and coagulating the albuminous fluids of the body, and thus giving rise to the local effects of irritation.

“Hence, before using chloroform vapour in surgical prac-

tice, it is indispensably necessary to ascertain whether it be pure. M. Mialhe finds that the following is a very delicate test of the presence of alcohol in chloroform:—Place some distilled water in a tube or glass, and drop on it a small quantity of chloroform. The greater part sinks immediately to the bottom of the vessel, owing to its great density (sp. gr. 1.48.) A small quantity floats by repulsion, but may be made to fall in small globules by agitation. If the chloroform be pure, it remains transparent at the bottom of the vessel; but if it contain only a small portion of alcohol, the globules acquire a milky opacity.”

Assuming the whole of the facts to be as stated by M. Mialhe, this test would appear to be a very delicate one, for we have found that some specimens of chloroform, which remained transparent when added to water, acquired a perceptible opalescence if treated in the same way after the addition of one-thousandth part of absolute alcohol, and the effect became marked when the alcohol amounted to one three-hundredth. If rectified spirit be added in small quantity to transparent chloroform, the mixture becomes at once opalescent, although a larger quantity of spirit forms a clear solution; so that when transparent chloroform contains minute quantities of alcohol, it seems probable that the latter is in the anhydrous or nearly anhydrous condition, as stated by Mialhe, and that the milkiness which takes place, on the addition of water, is the consequence of the hydration of the alcohol. This milkiness generally disappears with a slight increase of temperature, the momentary application of a warm hand to the tube containing the mixture being sufficient to render it transparent. It may be inferred from this, that the test which appears to be so delicate at a low temperature would not be equally, if at all, delicate in warm weather.

When chloroform has become milky from contact with water, it immediately reacquires its transparency on shaking it with a little fused chloride of calcium. This effect is not

so readily produced by contact with oil of vitriol; on the contrary, chloroform, previously transparent, becomes opalescent when oil of vitriol is added to it. If the opalescence be ascribed to hydration, the water must, in this case, be taken from the oil of vitriol, which is not probable.

It is difficult to account for the effect ascribed to the presence of minute quantities of alcohol, and, indeed, the subject requires further investigation.

Pyroxylic spirit may be substituted for spirit of wine in making chloroform, and under these circumstances the process, in the first stage of it, is more manageable and less subject to accidents than when alcohol is used. The reaction which takes place on the application of heat is less violent, and is not accompanied by so much frothing and disengagement of gas. Unfortunately, however, the product thus obtained is unfit for medicinal use, as it retains a disagreeable flavour, acquired, probably, from impurities which are always present in pyroxylic spirit.

Some specimens of chloroform which have been offered for sale at a very low price, have evidently been made from pyroxylic spirit, the taste and smell indicating their origin.

The editor of the Medical Times mentions the following among the chemical properties of chloroform:—

“It rapidly evaporates, producing great cold when dropped on the skin. It has neither an acid nor alkaline reaction, but is perfectly neutral when pure. It is easily dissolved by alcohol and ether, but is again separable by water. It readily deoxidizes nitric acid by the aid of a moderate heat: gold is not dissolved by this mixture, hence no hydrochloric acid is formed, and no chlorine is evolved. Chloroform does not dissolve gold, nor does it bleach vegetable colours; hence it contains no free chlorine. Potassium floats in it without decomposing it, and no gas is evolved, (If much alcohol or ether were present, there would be an evolution of hydrogen.) It forms a milky liquid, but does not enter into combination with caustic potash. It gives

an oily-looking stain to paper, easily dissipated by heat; the vapour is not inflammable, but it renders the flame of a wax-candle smoky and carbonaceous, like chlorine. What is commonly sold as chloric ether is a solution of chloroform in alcohol. The alcohol may be detected and separated by water, as in the washing of ether; it may be also detected by potassium; and as chloroform boils at 140° , and alcohol at 172° , it is probable that Dr. Ure's method of detecting pyroxylic spirit in alcohol, by the temperature of ebullition, might be applied to the detection of alcohol in chloroform."

In reference to the administration of the vapour of chloroform, we quote from the *Lancet* the following statements recently made by Dr. Snow, which involve some points worthy of notice.

"Dr. Snow made some remarks respecting chloroform, at a recent meeting of the Westminster Medical Society. He said that this agent, which had been introduced by Dr. Simpson, to be inhaled instead of ether, was preferable to the latter in some respects, although it was impossible that any thing could be more efficient than ether, as it was capable of totally preventing the pain in every operation in which it might be properly applied. He considered that the action of chloroform on the nervous system was identical with that of ether. By regulating the proportion of vapour in the air, he had produced the same effects on animals by both agents; chloroform, however, had the advantage of being less pungent, and, therefore, less care was required in graduating its first admission to the lungs; it was readily inhaled, and produced its effects with great rapidity, and the quantity of it consumed was curiously small when compared with ether. He had administered it on Thursday, in an amputation of the breast performed by Mr. Tatum, at the St. George's Hospital. He gave it with his usual apparatus, the water-bath being 55° , and the quantity of vapour in the air inhaled not more than ten per cent. by

measure, yet the patient was ready for the operation to begin in less than a minute, and it was performed without the least sign of pain, being equal to the best cases of etherization. The patient recovered her consciousness, as might have been expected from narcotism by ether to the same degree, and she was going on well. Only one fluid drachm of the material was used, although about ten fluid drachms of ether would probably have been used in the same operation. He (Dr. Snow) had inhaled it until he became unconscious, and was very sick afterwards, as on the only occasion on which he inhaled ether to the same extent. When the full effects of ether could be induced quickly, there was no preliminary excitement, and as the new agent produced its effects very speedily, excitement previous to insensibility could probably be altogether avoided in its use. The chloroform placed on the table had been given to him by Mr. Bullock, the chemist; it had been rectified from chloride of calcium; he (Dr. Snow) found its boiling point to be 140° ; he was not aware that the elastic force of its vapour, at other temperatures, had been ascertained; but, from some experiments that he had made, it seemed to follow a ratio very similar to those for ether-vapour and vapour of water; he had ascertained the quantity of vapour of chloroform that air would hold in solution, at various temperatures, and it was shown in a table, of which the following is a copy.

Quantity that 100 cubic inches of air will take up.

Temp.	Cubic inches.
50°	9
55°	11
60°	14
65°	19
70°	24
75°	29
80°	36
85°	44
90°	55

The quantity of this vapour in the air the patient inhaled, at ordinary temperatures, was only about a quarter as much by measure as there would be of ether—being, however, nearly twice as heavy; there was nearly half as much by weight. Now, on account of the small space it occupied, it only excluded the air to a quarter the amount that ether-vapour did, and therefore interfered but little with the natural process of respiration; the patient, indeed, could take in nearly the usual amount of oxygen without quickening or enlarging the respiratory movements. It was to be observed that temperature exerted a great influence over the quantity of this vapour that air would take up, and thus an elevation of little more than fifteen degrees in the warmth of the apartment, would double the amount of it which the patient would inhale in a given time, if no means were taken to regulate the evaporation. Dr. Simpson recommended the chloroform to be inhaled from a sponge or handkerchief, and this simple means was efficient; but he (Dr. Snow) preferred to use an apparatus, as, without it, more of the vapour was blown away by the warm breath of the patient, than was inhaled. The strength of the vapour could not be regulated; it could not even be known when it was all expended, and no exact observations could be collected. The chloroform was of easier application than ether, on account of its quicker action; but, for the same reason, greater care was required in its use, to avoid accident."

In conclusion, it may be well to repeat, what has already been stated, that chloroform differs from the liquids sold under the names of *chloric ether* and *terchloride of carbon*, inasmuch as these last-named substances are solutions of chloroform in spirits of wine, and the processes originally given for the preparation of these would be inapplicable for the preparation of chloroform.

Chloric ether and *terchloride of carbon* are subject to much greater variations in quality and composition than chloroform is. There are no recognized standards by

which the strength of these compounds may be estimated. Some specimens contain only five or six per cent. of chloroform, while others contain sixteen or eighteen per cent. The latter may be considered the composition of good chloric ether, and this quantity ought to separate from the spirit, forming a dense stratum at the bottom, when the chloric ether is mixed with twice its volume of water. The separation should be effected in a graduated tube, and the mixture well shaken together to insure the complete removal of the spirit by the water, the mouth of the tube being at the same time closed with a cork, to prevent evaporation of the chloroform.

Chloric ether has been used for many years, and is strongly recommended by some medical men as a valuable diffusible stimulant when administered in doses of half a drachm or a drachm. It is worthy of trial as a remedy for cholera. As the chloroform, the active constituent of this so-called ether, is separated and rendered insoluble on admixture with water or aqueous liquors, it seems desirable to point out a convenient form for its administration. Cases have occurred in which a patient has been intoxicated by the last dose of a mixture containing chloric ether, the chloroform having separated and collected at the bottom of the bottle, and having been consequently administered almost exclusively in this dose.

Mr. Morson, who has had much experience in the preparation and administration of chloric ether, recommends the following as the best method of administering it:—

R Chloric ether, ℥vj.
Syrup, ℥ss.
The yolk of an egg.
Distilled water, ℥ivss.

Rub the yolk of egg with the syrup, then add the chloric ether and the water, mixing them together to form an emulsion. The chloroform is held in suspension in this mixture, so that the evil above alluded to would be obviated.—*Pharm. Journ.*

ART. XXIV.—OBSERVATIONS ON THE PREPARATION OF
THE OXIDE OF GOLD, (AURIC ACID.)

BY L. FIGUIER.

THE oxide of gold is at present extensively used in the arts, owing to its substitution for the cyanide of gold in the liquids employed in electro-gilding. This has induced me to determine by comparative experiments which of the processes employed for the preparation of this oxide is that which offers the greatest advantages. Three processes have been described. The first, proposed by J. Pelletier, consists in treating a solution of the chloride of gold with calcined magnesia, and subsequently decomposing the aurate of magnesia thus formed with dilute nitric acid. The second process, which I have described in my memoir on the oxides of gold, consists in decomposing a solution of chloride of gold with carbonate of soda and boiling. The amount of carbonate of soda should accurately suffice to saturate the acid without the liquid acquiring an alkaline reaction. In the third process, which I have recently proposed, the oxide of gold is obtained by treating in the cold, a solution of chloride of gold with chloride of barium to which some caustic potash has been added. A precipitate of aurate of baryta is formed, which is decomposed with nitric acid.

With a view of comparing these three processes, I have determined the quantity of oxide which each is capable of yielding with the same weight of gold. 10 grms. of gold furnished by Pelletier's process 9.08 grms. oxide, well dried by long exposure to the air. With carbonate of soda 10 grms. of gold yielded 10.48 of oxide; and the same quantity of metal, treated with chloride of barium and potash, gave 11.72 oxide. This last process is consequently the most advantageous as regards the amount of product, but it is

likewise that which yields the purest oxide. The oxide of gold obtained by carbonate of soda retains a certain quantity of alkaline carbonate, which cannot be removed by washing. On decomposing a little of the oxide by heat, and exhausting the gold with hydrochloric acid, the liquid leaves on evaporation a residue of chloride of sodium, while the oxide prepared with chloride of barium affords no appreciable residue when treated in the same manner, and the solution is scarcely rendered turbid by sulphuric acid. The process is moreover so rapid and simple of execution, that on this account alone it appears to me preferable to the two others, especially to Pelletier's, which, as is well known, is long and tedious on account of the large bulk of the magnesian precipitate and of the time required for washing. I think it may be useful therefore to describe this new process at some length, especially as the only account of it hitherto published is a brief notice in the new edition of Soubeiran's "*Traité de Pharmacie*":—1 part of gold is dissolved in 4 parts of nitromuriatic acid, the solution evaporated to dryness, redissolved in water, which leaves a slight residue of metallic gold and of protochloride, which is redissolved with a little nitromuriatic acid. This solution is again evaporated to dryness, and redissolved in water. The solution of the chloride of gold, which is thus obtained quite free from acid, is mixed with pure potash (perfectly free from chloride) until it has a strong alkaline reaction upon curcuma-paper. It immediately becomes turbid; the solution is then mixed with chloride of barium, which instantly yields a canary-yellow precipitate of aurate of baryta. The addition of chloride of barium is discontinued when the precipitate begins to appear slightly white, which shows that the whole of the oxide of gold being precipitated, the alkali has begun to act upon the baryta of the chloride of barium. The supernatant liquid is colourless; consequently the metal is almost entirely precipitated from its solution. The aurate of baryta thus

obtained is very heavy, and easily washed by decantation. It is washed until the waters cease to be precipitated by sulphuric acid; the aurate of baryta is then treated with nitric acid diluted with water, which sets the oxide of gold free. It is requisite to heat the liquid to boiling, and to keep it at this temperature for some minutes, in order to decompose the last traces of the baryta salt. On washing by decantation until the water no longer reddens litmus-paper, the oxide is obtained pure.

By whichever process the oxide of gold is obtained, particular attention must be paid to the mode of drying it. The temperature of boiling water, which is sometimes used, frequently reduces a part of it. It may be dried *in vacuo* or under a bell-glass over sulphuric acid; but the most simple plan is to press it between folds of blotting-paper, and to expose it to the air protected from the light.

I may briefly notice, before concluding, the best method of obtaining the gold from the liquids resulting from these operations. The liquids resulting from washing the aurate of baryta must not be mixed with those obtained in washing the oxide. The first contain far more gold. They are concentrated by evaporation, and the baryta precipitated by sulphuric acid; the liquid, after standing, is decanted, and a solution of protosulphate of iron added to it, which precipitates the whole of the gold. The waters derived from washing the oxide are also evaporated and precipitated by sulphuric acid; but they must not be treated immediately with protosulphate of iron, on account of the action which the free nitric acid they contain, exerts upon this salt. After precipitation with sulphuric acid, the liquid is decanted and evaporated to dryness, and the small residue obtained treated with nitromuriatic acid. This solution is evaporated nearly to dryness to expel the nitric acid, then diluted with water, and treated with sulphate of iron.—*Chem. Gaz. from Journ. de Pharm.*

ART. XXV.—ON FLUID CAMPHOR.

By SIR. J. MURRAY.

I wish to bring before the notice of the Pharmaceutical Society, a *permanent* solution of camphor, which I submitted in my Thesis at Edinburgh to the Faculty of that University in 1838. I have had so many proofs of its superiority over crude camphor, and its ordinary preparations, that I have been induced to bring it out more prominently before the medical profession and the public. The proportions found most beneficial during twenty years' experience are three grains of camphor and six grains of bicarbonate of magnesia to each ounce of the fluid. The magnesia is shown by boiling the liquor, the camphor by saturating a glass of the solution with muriate of soda or any dry salt. By thus abstracting part of the water, the camphor is set free, and rises in flakes, like snow, forming a frost-work crust on the surface.

This is a homely experiment, but it is more speedy at a meeting or lecture than more elaborate analysis. The specific gravity of the fluid camphor is 10.026, water being 10,000. The very moderate proportion of magnesia does not interfere with the virtues of the camphor; but on the contrary, by neutralizing gastric acids, the properties of the camphor are more favourably displayed. This has been particularly observed during the present low fevers and bowel complaints, when the fluid was used alone, or as the vehicle for laudanum, tonics, or astringents.

Perhaps a few remarks may be allowed respecting the *remedial agency* of fluid camphor. It has undoubtedly succeeded in soothing and composing the nerves, in cases where solid camphor irritated and disturbed them.

When exhibited in powder, pill, or bolus, or, what is

nearly as bad, in stimulating tinctures, the camphor acts as a local acrid, inflicting pungent pain of the mucous membrane lining the alimentary passages.

The modes of administering camphor having remained almost without any improvement since the days of the Arabian writers, caused great diversity of opinion, not only as to its medicinal qualities, but also its proper doses.

Further, its action being transitory, part of its influence passed away from its usual formulæ before the whole drug became dissolved or absorbable in the stomach; an evanescent medicine should be taken in such a ready and available state, that its entire agency may be promptly brought to bear, without waiting for the uncertain or partial delay of digestion in the stomach.

It is needless to occupy time by further observations, it being more desirable to obtain than to offer opinion; but it may be remarked that whatever character camphor has enjoyed for many ages, its true medicinal value must be greatly enhanced, when administered in a certain, fixed, uniform and elegant manner, rather than the unpleasant and uncertain methods hitherto in use.—*Pharm. Journ.*

ART. XXVI.—ON MURIATE OF OPIUM.

By J. G. NICHOL, M. D., OF CROOK, DURHAM.

DURING the last ten or twelve years I have made and prescribed a solution of opium, which I think is not mentioned in any work on *Materia Medica* with which I am acquainted. I use powdered Turkey opium and water, pretty strongly acidulated with muriatic acid. I have found, by experience, that this is the best anodyne I am acquainted with. I see, by Dr. Pereira's *Materia Medica*, that mention is made of Dr. Porter's solution of opium in citric acid. I made and used the same sort of preparation ten years ago; but it did not answer. It caused a great deal of headache, and other unpleasant symptoms; moreover, it became muddy, and appeared to be decomposed; therefore, I gave up using it. I have called this preparation of mine Muriate of Opium, but perhaps it is not a very correct name. I may mention that I prepared solutions of opium with acetic, nitric, sulphuric, citric, tartaric, and muriatic acids, and also prescribed them, but the muriatic solution was vastly superior to any one in every respect. All of them produced *headache* with the exception of the *muriatic*. I prefer muriate of opium to the tincture, wine, or powder of opium, and also to the muriate and acetate of morphia; in fact, to any other preparation of opium. It never makes my headache, but all the other preparations do.

My preparation is made according to the following formula:—

Take of The best powdered Opium, \mathfrak{zj} .
 Muriatic Acid, \mathfrak{zj} .
 Distilled Water, \mathfrak{zxx} . Mix.

Shake this mixture very frequently every day, during fourteen days, then strain and filter. The dose is from

twenty to forty drops, according to circumstances. Many of my medical friends have tried this preparation, and they highly approve of it. I have taken the liberty of sending you a small quantity as a specimen.—*Ibid.*

ART. XXVII.—ON THE VALUE IN ABSOLUTE ALCOHOL OF SPIRITS OF DIFFERENT SPECIFIC GRAVITIES.

BY GEORGE FOWNES, F. R. S.

HAVING been for some months past occupied with experiments on the fermentation of sugar and molasses, and having found it necessary to construct for the purpose a new table of the quantity per centum by weight of absolute alcohol contained in spirits of different specific gravities, I venture to lay the same before the Royal Society, hoping that it may be found generally useful in inquiries of this kind, and also for other purposes.

The table was formed synthetically; absolute alcohol and distilled water were weighed out in the required proportions, mixed in small, well-stopped bottles, and well shaken together. After standing three or four days, the mixtures were brought to the temperature of 60° Fahr. exactly, and their specific gravities determined with great care. After the lapse of two or three days more, this last named operation was repeated, but in no case was it observed that any further contraction had occurred. Neither was the specific gravity of a mixture, containing nearly equal parts alcohol and water which had been so examined, changed by being enclosed in a strong, accurately stop-

pered bottle, and heated for some time to a temperature above its boiling point.

In this manner, each alternate number in the table (each even number) was obtained by direct experiment; the others were then interpolated. When completed, the table was examined by various methods calculated to test its accuracy, but no error of sufficient magnitude to limit its usefulness was detected.

The absolute alcohol employed in these experiments was prepared in the following manner:—the strongest rectified spirit was agitated with half its weight of carbonate of potash, deprived of water of crystallization, and left in contact with the salt some days. It was then decanted upon half its weight of powdered quicklime, made from black marble, contained in a metal still, which could be perfectly closed. The mixture of spirit and lime was retained in a warm situation for a week or thereabouts, and then distilled by means of a water-bath. By this treatment the specific gravity of the alcohol was generally reduced to .796, or even below, and by a repetition of the process of digestion with powdered lime and re-distillation, the last traces of water were removed. In this manner, without difficulty, the very considerable quantity of absolute alcohol required for the experiments was procured.

Absolute alcohol thus obtained, has the specific gravity .7938 at 60° Fahr.; it is extremely expansible by heat, which renders the determination of its exact specific gravity difficult and troublesome when the temperature of the room is either above or below 60°. The same remark applies to the mixtures of alcohol and water extending over more than half the table, the most minute precautions regarding temperature being necessary to avoid serious errors. In a glass retort, containing pieces of copper foil, absolute alcohol boils at 177° Fahr., the barometer standing at 29.75 inches. Lastly, when analysed by combustion with oxide

of copper, it yields numbers representing the proportions of carbon and hydrogen present, so closely agreeing with those required by theory, as to leave no doubt of its purity and freedom from all admixture.

Specific gravity.	Per-centage of alcohol.	Specific gravity.	Per-centage of alcohol.	Specific gravity.	Per-centage of alcohol.
.9991	0.5	.9511	34	.8769	68
.9981	1	.9490	35	.8745	69
.9965	2	.9470	36	.8721	70
.9947	3	.9452	37	.8696	71
.9930	4	.9434	38	.8672	72
.9914	5	.9416	39	.8649	73
.9898	6	.9396	40	.8625	74
.9884	7	.9376	41	.8603	75
.9869	8	.9356	42	.8581	76
.9855	9	.9335	43	.8557	77
.9841	10	.9314	44	.8533	78
.9828	11	.9292	45	.8508	79
.9815	12	.9270	46	.8483	80
.9802	13	.9249	47	.8459	81
.9789	14	.9228	48	.8434	82
.9778	15	.9206	49	.8408	83
.9766	16	.9184	50	.8382	84
.9753	17	.9160	51	.8357	85
.9741	18	.9135	52	.8331	86
.9728	19	.9113	53	.8305	87
.9716	20	.9090	54	.8279	88
.9704	21	.9069	55	.8254	89
.9691	22	.9047	56	.8228	90
.9678	23	.9025	57	.8199	91
.9665	24	.9001	58	.8172	92
.9652	25	.8979	59	.8145	93
.9638	26	.8956	60	.8118	94
.9623	27	.8932	61	.8089	95
.9609	28	.8908	62	.8061	96
.9593	29	.8886	63	.8031	97
.9578	30	.8863	64	.8001	98
.9560	31	.8840	65	.7969	99
.9544	32	.8816	66	.7938	100
.9528	33	.8793	67		

ART. XXVIII.—PATENT GRANTED TO PAUL GILBERT PRE-
LIER, FOR IMPROVEMENTS IN THE MANUFACTURE OF
DRY SULPHURIC ACID AND NORDHAUSEN SULPHURIC
ACID.

THE patentee commences his specification, by stating that, in consequence of the great affinity of sulphuric acid for water, it is difficult to concentrate the acid even to 66° B.; therefore, in order to obtain dry sulphuric acid, he combines simple sulphates with a fresh proportion of acid for the purpose of forming bisulphates, which he decomposes by the action of heat, and thus obtains dry sulphuric acid. The manufacture of dry acid naturally leads to the production of smoking or Nordhausen sulphuric acid, as the latter is formed by the addition of dry acid to sulphuric acid which has been concentrated to 66° , the specific gravity of the Nordhausen acid increasing with the quantity of dry acid added.

In carrying out the invention, the patentee prefers to employ 100 parts sulphate of soda, 2 parts sulphate of potash, and 2 parts sulphate of lime; but these proportions may be varied; and even if sulphate of soda alone be employed, dry sulphuric acid will be obtained. The mixture is put into freestone retorts, set in a suitable furnace; then, by means of a bent glass tube, the acid is introduced into the retorts, and heat is gradually applied. Shortly after the application of heat, drops of water will proceed from the retorts, then acidulated water, followed by acid at 40° , 50° , and 66° , and finally by acid which fumes or smokes. To enable the operator to judge correctly as to the progress of the operation, vessels containing water are placed to receive the drops of acid; and when each drop produces a sound resembling that which would result if a red-hot iron was

immersed in the water, the acid that produces the noise is dry acid. Vessels to receive the acid are now placed below the retorts, and luted with clay; and the retorts are subjected to a strong heat until the acid ceases to drop into the vessels. Dry acid is thus obtained; but if it be desired to obtain Nordhausen sulphuric acid, a quantity of acid, concentrated to 66° , must be introduced into the receiving vessels, when they are placed below the retorts; and by the admission of the dry acid the density of the acid in the receiver will be increased to 67° , 68° , and 69° , according to the quantity of dry acid that enters the receiver. By this means sulphuric acid is obtained perfectly clear, and never coloured like the Nordhausen sulphuric acid, nor charged with earth or other foreign matters.—*Chem. Gaz.*

ART. XXIX.—ON THE CONVERSION OF TANNIC INTO GALLIC ACID.

By C. WETHERILL.

THE following experiments were made with a view to ascertain whether a substance is contained in tannic acid which constitutes this acid when conjoined with gallic acid. The author is led from his investigation to regard tannic as isomeric with gallic acid dried at 212° , and to derive the latter from it by the fixation of water. The tannic acid used in the experiments was prepared according to Pelouze's method, and was purified by solution in spirit, and subsequently in water. It was white, and was perfectly precipitated from its solution in water by sulphate of quinine, so that the liquid filtered from the precipitate was

no longer coloured by persalts of iron. Of the different substances examined, sulphuric acid appeared to effect the conversion of the tannic acid best. If 50 grms. of dry tannic acid are heated to boiling in a mixture consisting of 100 cubic centimetres sulphuric acid of 1.84 spec. grav. and 400 cubic centimetres water, there will be found in the course of a few days an abundant precipitate of very white gallic acid. Once, on employing this process, the sulphuric acid was removed by means of carbonate of baryta, the liquid filtered, evaporated to dryness, weighed, treated with ether, and again weighed, and the solution acidified with acetic acid, treated with basic acetate of lead. This last precipitate was well washed and decomposed with sulphuretted hydrogen, after which the filtered solution was treated as above. In the first treatment, 12 per cent. of a substance insoluble in ether was obtained, which consisted principally of gallate of baryta, and of 1 to 2 per cent. of a black body, which was probably an impurity in the tannic acid. The precipitated sulphate of lead, and likewise the sulphate of baryta, also parted with gallic acid to nitric acid; but excepting the above mentioned black substance, nothing further could be detected: and it therefore appears that the entire amount of tannic acid was in the above manner converted completely into gallic acid. Lime might be substituted for the baryta with the same result. The maximum quantity of gallic acid obtained amounted to 87.4 per cent. of the tannic acid. In an analysis of tannic acid, the author arrived at the generally admitted formula $C_{10}H^8O^{12}$; it yielded 50.63 carbon, 3.64 hydrogen, and 45.73 oxygen. Wackenroder and Larocque have stated that this conversion may also be effected by ferments, albumen, blood, and a substance capable of fermentation in gall-nuts; and Humfeld found that tannic acid was destroyed without the formation of gallic acid, by the action of oxidising agents, such as manganese, chromic acid, peroxide of mercury, &c. If the results of the analyses of

gallic acid dried at 212° are compared with those of tannic acid, it appears, as above stated, that the former is derived from the latter by the fixation of water. We have—

	Gallic acid according to Pelouze.			Tannic acid.		
Carbon,	49.56	7 =	49.41	50.63	18 =	50.93
Hydrogen,	3.70	3	3.53	3.64	8	3.79
Oxygen,	46.74	5	47.06	45.73	12	45.28

These numbers do not differ much from one another; and if we bear in mind that tannic acid is uncrystallizable, and that a slight impurity of one of the substances is sufficient to produce the above differences, and moreover that tannic acid is bibasic, we may perhaps represent gallic acid by $C^7 H^3 O^5$, and tannic acid by 2 ($C^7 H^3 O^5$) or $C^{14} H^6 O^{10}$. Crystallized gallic acid is then derived from the latter by the assimilation of water.—*Chem. Gaz. from Journ. de Pharm.*

ART, XXX.—ON THE ACTION OF NITRIC ACID UPON BRUCINE.

By S. G. ROSENGARTEN.

GERHARDT asserts that nitrous ether is obtained on treating brucine with nitric acid, while Liebig, on repeating the experiment, obtained a liquid with properties different from those of nitrous ether. Recently Laurent has examined the subject; he operated upon 15 grms. of brucine, and let the gas which was evolved pass over lime, upon which he condensed it by means of a frigorific mixture. In this manner he obtained 1 gram. of a very mobile liquid, lighter

than water, and which possessed the odour of nitrous ether. The liquid was rectified at a temperature which did not exceed 50° , upon which it was submitted to analysis. The analysis afforded 29 per cent. carbon and 6 per cent. hydrogen; nitrous ether contains 32 per cent. C and 6.6 H. Notwithstanding the great difference of 3 per cent. in the amount of carbon, these results nevertheless, in Laurent's opinion, justify the conclusion that the gas evolved in the action of nitric acid upon brucine, at the ordinary temperature, is nitrous ether.

When the action of the nitric acid at the ordinary temperature is terminated, the residue is an orange mass; and Laurent states that he succeeded in crystallizing it. This substance, which Laurent calls *cacotheline*, gave on analysis (the results are not enumerated) numbers which led to the formula $C^{42}H^{32}N^4O^{20}$. When 3 equivs. nitric acid are added to 1 equiv. brucine, and we subtract 1 equiv. nitrous ether and 2 equivs. water, the formula of *cacotheline* remains.

The great difference in the composition of the volatile product from that of nitrous ether rendered a further examination desirable. To obtain the liberated gas, fused brucine was mixed in a small retort with nitric acid of 1.4 spec. grav. in the cold; a violent disengagement of gas resulted, with evolution of heat; red vapours appeared, but in very minute quantity. The gas was first passed through a tube two feet long, filled with hydrate of lime, and then through one of the same length containing chloride of calcium. The gas burnt with a green flame, coloured a solution of iron immediately black, and was absorbed with remarkable ease by concentrated sulphuric acid; the sulphuric acid gradually assumes a beautiful blue colour, which after a time passes into a reddish one.

When a few drops of water were added to the acid, a violent evolution of gas immediately resulted, and red vapours made their appearance, accompanied by the odour

of nitrous acid. From want of ice and the high temperature during the last summer, all attempts to condense the gas were in vain; it was therefore analysed by connecting a long combustion tube with the preceding apparatus. The tube was provided, as usual, with the chloride of calcium and potash apparatus, and filled partly with recently ignited copper turnings, and partly with oxide of copper. Every caution was employed to get rid of hygroscopic moisture. In one experiment, with 10 grms. brucine, the author obtained 0.3167 carbon and 0.0799 hydrogen, which in equivalents is in the relation of 4 : 6.05. In a second experiment with 6 grms. brucine, the relation was found to be as 4 : 6.38. This is far removed from the relative quantity of carbon and hydrogen in the ethers, and it is quite certain that the reaction is not so simple as stated by Laurent and Gerhardt.

A portion of the residue was treated with alcohol; the colour on drying was reddish-yellow, and not at all beautiful. On analysis it afforded—

Carbon	-	-	-	51.68	51.86
Hydrogen	-	-	-	5.44	5.51
Nitrogen	-	-	-	13.58	
Oxygen	-	-	-	29.30	

Laurent observes that he succeeded in crystallizing this body; but he does not describe by what method. The only method by which I could obtain any considerable quantity in crystals was by dissolving it in water strongly acidified with nitric acid. The cacotheline then crystallized in beautiful yellow laminæ, and on analysis afforded—

$C^{42}H^{22}N^4O^{30}$					
Carbon	-	-	-	51.57	51.50 51.43
Hydrogen	-	-	-	4.75	4.80 4.48
Nitrogen	-	-	-	12.69	.. 11.43
Oxygen	-	-	-	30.99	.. 32.66

A solution of this substance, mixed with nitrate of ammonia and silver, yields a flocculent precipitate, which is

likewise the case with salts of mercury and lead. The silver salt detonates when heated. The silver was determined in it several times as chloride; the results always differed. The reactions of this body agree with those described by Gerhardt.

By the action of manganese and sulphuric acid upon brucine, a substance was obtained in the aqueous distillate, which possessed a peculiar odour and reduced nitrate of silver in the form of a very beautiful mirror; it was not altered by potash, and was consequently no aldehyde; nor could any formic acid be detected in it.

From the foregoing experiments, although imperfect, it is evident that the gas evolved in the action of nitric acid upon brucine is not pure nitrous ether, and also that the formula of cacotheline cannot be that proposed by Laurent, although with respect to the amount of carbon and hydrogen the analyses agree.—*Chem. Gaz. from Liebig's Annalen.*

ART. XXXI.—ON THE BALSAM OF TOLU AND SOME PRODUCTS OBTAINED FROM IT.

By E. KOPP.

THE composition of the balsams of Tolu and Peru has been established by the researches of M. Plantamour and by the beautiful investigations of MM. Fremy and Deville. M. Deville also examined the products of the destructive distillation of the balsam of Tolu, and we are indebted to him for the discovery of benzoene and its derivatives, substances analogous to benzine; one of these derivatives,

nitrobenzoene, has been transformed by Muspratt and Hofmann into a remarkable artificial alkaloid, toluidine. My experiments confirm the greater part of the results already obtained. The balsam of Tolu is composed of—

1. A very small quantity of tolene, $C^{10}H^8$ ($C=75$ H= 6.25 .)
2. Free cinnamic acid, $C^{18}H^8 O^4$.
3. A resin very soluble in alcohol, $C^{36}H^{10}O^5$.
4. A resin but little soluble in alcohol, $C^{18}H^{10}O^5$, or rather $C^{36}H^{20}O^{10}$.

1. *Tolene*.—This carburet of hydrogen was prepared exactly according to the method proposed by M. Deville. It is colourless, very fluid, of a pungent and slightly peppery taste, and possesses an odour resembling that of elemi. Its specific gravity at 50° F. is 0.858, and its boiling point between 309° and 320° F. When set aside in an imperfectly closed tube, it gradually becomes resinified and very slightly coloured. M. Deville assigned to it the formula $C^{12}H^9$. My analyses, which differ but little from those of M. Deville, agree better with the formula $C^{10}H^8$, which also corresponds with the boiling point.

2. *Cinnamic Acid*.—The free acid of the balsam of Tolu is cinnamic acid only, as M. Fremy had observed. This fact was proved by analysis and by the conversion of the acid into nitrocinnamic acid, which is but very slightly soluble in cold alcohol, whilst benzoic and nitrobenzoic acids are very soluble in it.

The results obtained by M. Deville probably arise from his having examined the acids obtained by the distillation of the balsam, or extracted by concentrated alkaline solutions. I have proved that under these circumstances the resins of the balsam of Tolu become transformed in such a manner as to give rise to the formation of a large proportion of benzoic acid. The resins, carefully distilled with caustic soda, yield pure benzoine and a carbonaceous residue, containing a considerable quantity of benzoate of soda (the

boiling point of protonitrobenzene is 446° F.) Cinnamic acid, when mixed with concentrated and cold caustic soda, and exposed to a current of chlorine, becomes transformed into chlorocinnamic acid, $C^{10}(H^7 Cl)O^4$. However, if the temperature is high and the reaction violent, the chlorinated oil noticed by Stenhouse is disengaged, and chlorobenzoic acid formed. These two acids resemble each other considerably, but the latter is more soluble in water and alcohol, and the salts crystallize more readily. It is also obtained from benzoic acid, caustic soda and chlorine. Cinnamic acid, when treated with concentrated nitric acid, is at first transformed into nitrocinnamic acid, then into benzoic acid, and finally into nitrobenzoic acid.

Cinnamic and benzoic ethers also become transformed but with more difficulty, into nitrocinnamic and nitrobenzoic ethers. A great portion of the ether is almost always decomposed and the acids set free. Nitrobenzoic æther is solid, colourless, and of an aromatic taste and odour. It crystallizes in beautiful laminæ, belonging to the right prismatic system. Its fusing point is 116° F., and its boiling point 564° . It is easily obtained by subjecting an alcoholic solution of nitrobenzoic acid to a current of muriatic acid. Its formula is $C^{14}(H^4 NO^4)O^3 + C^4 H^5 O = C^{18} H^9 NO^2$. Nitrocinnamic acid, dissolved in an alcoholic solution of sulphuret of ammonium, is reduced with the aid of a slight elevation of temperature. Sulphur is deposited, and two distinct matters are formed, one of which, of a yellow madder colour, belongs to the class of resins, and the second to the class of alkaloids. The latter is solid, colourless, crystallizable in warts, insoluble in water, soluble in alcohol and ether, and forms difficultly crystallizable salts.

Resin a. $C^{36} H^9 O^2$.—This is brown, translucent, brittle when cold, and shining; its powder agglomerates at 59° , and fuses completely at 140° F. Concentrated sulphuric acid colours it purple. When dissolved in caustic potash and exposed to the air, it easily becomes oxidised and

transformed into the resin β . On dry distillation it yields benzoene and benzoic acid. It readily dissolves in alcohol and ether.

Resin A. $C^{10}H^{10}O^5$.—Dull yellowish-brown, neither taste nor smell, slightly fusible, (above 212° F.) but slightly soluble in alcohol and ether; less easily altered than the preceding resin. Sulphuric acid colours it violet-red; caustic potash dissolves it with a brown colour.

The mixture of the two resins, when treated with nitric acid, yields gaseous products, consisting of carbonic acid, nitrous vapours and deutoxide of nitrogen; volatile products, consisting of the hydruret of benzoyle, hydrocyanic and a little benzoic acids; and as a residue, a flaky yellow matter, which consists of benzoic acid, intimately combined with a yellow resinous colouring matter, which prevents it from crystallizing, and accompanies it in all its combinations, even in that with ether. By the action of heat, especially by distillation, the resinous matter is destroyed, and the benzoic acid is obtained in a perfectly pure state; the resin furnishes nearly the third of its weight of benzoic acid.

The constitution of the balsam of Tolu seems very simple.

Originally the balsam is formed by the soft resinous matter $C^{36}H^{50}O^8$, or that which gives rise to it. This resin, under the influence of the air, becomes converted into cinnamic acid and the resin β , $C^{36}H^{50}O^8 + O^2 = C^{18}H^{25}O^4 + C^{18}H^{10}O^5 + HO$. We observe, in fact, that in time the balsam of Tolu becomes hardened, and contains a larger quantity of cinnamic acid.

The resin $C^{18}H^{10}O^5$ can of itself easily yield benzoic acid, for $C^{18}H^{10}O^5 = C^{14}H^6O^4 + 2HO + C^4H^2$. Perhaps the tolene is derived from the carburetted hydrogen; but it is more probable that it becomes converted into a resinous

colouring matter, or into water and carbonic acid, by the action of oxidizing bodies.*—*Chem. Gaz. from Ann. de Chim. et de Phys.*

ART. XXXII.—IMPROVEMENTS IN THE PROCESS OF MANUFACTURING GAS.

THE progress of science and the stimulus of competition have been instrumental in effecting so great an improvement in the quality as well as in the economy of gas, that we now receive at the rate of seven shilling a thousand cubic feet, a gas of much greater purity and illuminating power than that which, a few years ago, was supplied at seventeen shillings. There is every reason to believe that further improvements will be effected, as several new companies are in progress of formation, all holding out to the public their respective claims to confidence and support, on the ground of their undertaking to supply a superior article at a reduced price. Among these aspirants we may mention the Western Gas-light Company, whose works are in course of construction at Kensall Green, who undertake to furnish a gas from Cannel coal, possessing an illuminating

*The presence of muriatic acid in the nitric acid singularly promotes the formation of oxalic acid. The resins of benzoin and Tolu do not yield oxalic acid when treated with pure nitric acid. It is obtained however when an impure acid is used. Pure nitric acid gives rise to terebic acid by reacting upon the oil of turpentine, and oxypieric acid, by oxidizing the gum-resins. On employing nitric acid containing a considerable quantity of muriatic acid, we obtain only oxalic acid under the same circumstances.

power 75 per cent. greater than that of ordinary gas, and free from the usual impurities.

The process adopted by the Western Gas Company is that which has recently been patented by Mr. G. H. Palmer. The specification (dated Oct. 17th, 1847,) describes the construction of furnaces said to be calculated to insure an equable temperature with tubes called regenerators, passing through the upper part of the furnaces, by means of which the gas is exposed to a dull red heat during its passage from the retort to the condenser. These regenerators contain a quantity of metallic chippings or loose plates of iron, the object of which is to increase the heated surface over which the crude gas passes. This part of the process is intended to deprive the gas of sulphur and some other impurities, and to increase its bulk and illuminating power. For its further purification it is made to pass through a "mechanical precipitator and cooling apparatus," in which a revolving fan keeps it in constant agitation, and causes the deposition of the tar and naphtha which runs out below. It next passes into "filtering towers," in which jets of liquid ammonia are thrown into it; after which it is introduced into a vessel in contact with steam at a high temperature, with which it is mechanically mixed. The mixture of gas and steam is then introduced into a refrigeratory or condenser, and the operation of steaming and condensing is repeated until all the condensible materials in the gas are separated. In addition to the above manipulation, the gas is also subjected to the usual purification with lime, in which Mr. Palmer describes an improvement, namely, the introduction of a blast of air prior to the removal of the refuse lime from the apparatus. Lastly, the specification describes a process for naphthalizing or denaphthalizing the gas by the introduction of naphtha or fixed oils into an apparatus resembling that which is used for treating the gas with liquid ammonia.

Among other testimony in favour of their process and its result, the directors of the Western Gas Company have furnished the St. Marylebone vestry with a copy of a report from Dr. Leeson, Professor Miller, and Mr. W. J. Hay, who have, on behalf of the Company, inspected a temporary apparatus erected for the purpose at Vauxhall, and analysed the gas.

This report speaks favourably of the process as being efficient, convenient, and free from the effluvia and other nuisances attending gas-works in general.

The gas is described as possessing a greater specific gravity than that of ordinary gas (in the proportion of 632 to 400) and an illuminating power considerably superior, four cubic feet of the patent gas when burnt giving a light equal to seven cubic feet of ordinary gas. It is also stated to be unusually pure, containing no sulphuretted hydrogen, no ammonia, and no carbonic acid. Such are the advantages offered to the public by the new company, and we have no hesitation in saying that if the managers can and will realize all that they have promised, much benefit will arise from the competition.

It must not be understood, however, that the process described in the specification of the patent is altogether a novelty. Mr. Palmer himself, in the year 1818, took out a patent, comprising in principle the main feature of his present process. A similar process was also patented by Mr. Down in 1832, and also, with some unimportant modification, by M. Malam in 1835. We have before us a plan and description of Mr. Malam's regenerators and furnace, which appear to be precisely identical with those described in Mr. Palmer's recent specification. Mr. Grafton took out a similar patent in 1841. The regenerators are condemned by the most experienced gas manufacturers, as it is found that the gas is injured by this additional heating, the increase in volume being effected at the expense of its illuminating power. The mechanical precipitator is in principle equiva-

lent to Lowe's patent scrubber, now used by the Chartered Gas Company. The steaming, condensing, and naphthalizing processes are adopted at the gas-works in Brick Lane, having been patented by Mr. Lowe in 1832. The blast of air claimed by Mr. Palmer was introduced some years ago in Hull by Mr. Malam. The process of naphthalizing gas has long been known and employed. Some years ago, it was described at one of the Friday evening meetings at the Royal Institution. We must therefore throw aside the impression that the advantages of Mr. Palmer's patent are confined to the works of the Western Gas Company, the most important parts of the process being already either employed at other works, or superseded by modifications answering the same purpose.

The chemical certificate must not be received as conclusive evidence of the uniform superiority of the gas to be furnished by the new company, for this certificate states, that "the gas furnished by different companies varies generally in illuminating power, as does that supplied by the same company at different times." It is well known, however, that one of the main difficulties in the manufacture of gas consists in the production of an equable and uniform product, the result being affected by variations in the temperature employed, and by other circumstances connected with the manipulation. The certificate, therefore, may be taken as evidence of the value and purity of a sample of gas produced for the express purpose of examination; further than this no dependence can be placed on it. The illuminating power of gas depends, in a great measure, on the proportion of carbon it contains, and its purity can be effected by various processes well known and often practised. It would be easy for any company to furnish, from ordinary coal, a sample of gas equal in every respect to that above described. It remains to be shown whether any company will continue to bestow the same

care and expense on the manipulation after having gained a footing.

If sanguine reports and tempting promises could be taken as evidence, we might congratulate the public on the birth of a company which throws all its predecessors into the shade. It is styled "The Cardinal and Central Gas Light-Ventilation, Animal Charcoal, and Carbonaceous Manure Company," and is about to shed its light upon the metropolis. Mr. Radley, the engineer, undertakes on behalf of this Company, to supply a "better gas than that of the Western Gas Company, at a maximum of four shillings a thousand cubic feet," and offers to guarantee, if encouraged by the parochial authorities, that "the price for gas, after the lapse of five years, will not exceed three shillings per thousand cubic feet!"

The public advantages of a fair and free competition are universally admitted, and on this ground it would appear desirable at once to encourage the advances of new companies. But in the present instance, it is requisite, as a prudent precaution, to institute a comparison between the respective claims of the several competitors to public *confidence*, before permission is given to any of them to inflict upon the public the inconvenience attending the opening of the ground in every street in which it may be proposed to lay down the pipes. This license certainly ought not to be granted unless with a well-grounded prospect of future benefit.—*Pharm. Journ.*

ART XXXIII.—ON THE GAMBOGE OF THE TENASSERIM PROVINCES.

BY THE REV. F. MASON, A. M.

IN conversation with a distinguished medical officer, and member of the Asiatic Society, I found that he was not at all aware that the Tenasserim provinces produce Gamboge. It has, therefore, occurred to me that a brief notice of the gamboge of these provinces might not be unacceptable to the readers of the Journal, and would contribute its influence to draw attention to the most interesting portion of the British provinces in the east, one that is exceeded by few in the richness and variety of its natural productions.

Three works in my possession describe gamboge each as the product of a different tree; a fourth represents all to be wrong, and a fifth suggests a different plant still. One refers it to *Cambonia gutta*, a plant which, as described by Linnæus, has probably no existence. He described a Ceylon plant, and it is now quite evident, says Dr. Wight, "that the character of the flower and ovary is taken from one specimen, and that of the fruit from a different one, owing to the imperfection of his specimens, and his not being aware that the lobes of the stigma, afford a sure indication of the number of cells of the fruit."

Another refers it to *Garcinia Cambogia*—but Dr. Wight says, that the exudation of this tree is "wholly incapable of forming an emulsion with the wet finger," a statement which the writer knows to be correct. The tree is very common in the Tenasserim provinces, but the bright yellow exudation it produces is certainly not gamboge.

A third refers it to *Stalagmitis cambogioides*; but Dr. Wight remarks, "the juice of this tree differs so very widely in its qualities from good gamboge, that it can never be expected to prove valuable as a pigment."

Dr. Graham has described a Ceylon tree under the name of *Hebradendron cambogioides*, which is said to produce good gamboge, but no gamboge has ever been exported into the English market from Ceylon. Thus it would appear, to use the language of Dr. Wight, "the tree of trees, which produces the gamboge of commerce, is not yet known."

Dr. Helfre, who was employed by government as a scientific naturalist in these provinces, at an expense of thirteen hundred rupees per month, reported, "the gamboge of this country dissolves very little with water, and consequently does not yield that yellow emulsion as the common *guttifera*. It will never serve as a colour, but promises to give a very beautiful varnish. This statement was controverted by a writer in our local periodical at the time, who said he had obtained "fine gamboge of the very best description," from our jungles, in which he was no doubt correct, but he erred when he added that it came from the "true *Stalagmitis cambogioides*." A very small amount of botany would have served to preserve him from falling into this error, for that plant has a quinary arrangement of its flowers, while the arrangement of the flowers of those that produce gamboge in these provinces is quaternary.

The hills that bound the valley of the Tavoy river on both sides from their basis to their summits, abound with a tree which produces a fine gamboge. It is Roxburgh's *Garcinia pictoria*, which he knew produced gamboge, but which he said was liable to fade. As soon as I satisfied myself of the identity of the trees, by an examination of the inflorescence of our plant compared with Roxburgh's description, I coloured a piece of paper, one band with this gamboge, and another with the gamboge of commerce: and subsequently exposed both to the weather equally for more than twelve months, but without being able to discover that one faded any more than the other. South of

the latitude of the mouth of the Tavoy river, and throughout the Province of Morgui, there is found, on the low plains at the foot of the hills, and on the banks of the rivers, almost down to tide waters, another species of *Garcinia*, that also produces good gamboge. I have no doubt but it is the tree from which Dr. Griffiths furnished Dr. Wight with specimens, and which the latter says "I refer doubtfully to Wallich's *G. elliptica*." We will call it then *G. elliptica*, a species which Dr. Wight has on his list of "species imperfectly known." The foliation and female flowers are, however, very well described, and to complete the description, I may add, the male flowers are pedunculated, but the peduncles are short, and they might be characterized as sub-sessile. The anthers, like those of the female flowers, are sessile, depressed or flattened above, and dehiscent circularly. The ripe fruit is globose, and not furrowed. As I send along with this paper specimens of both male and female flowers, any of your botanists will be able to correct me at a glance, if I be in error.

Neither Wallich, Wight, nor Griffiths, appear to have been at all aware that this species produces gamboge. Dr. Wight, in a recent number of his Neilgherry plants, says: "Two species of the genus *Garcinia* are known to produce gamboge; most of the others yield a yellow juice, but not gamboge, as it will not mix with water. The species which he has described as producing gamboge, and to which I suppose he refers, are *G. gutta*, *H. cambogioides* (Graham,) and *G. pictoria* (Roxburgh.) That others may be enabled to judge of the character of the gamboge produced by this tree, I have the pleasure to send specimens of its exudation. In its appearance to the eye, and in its properties as a pigment, I have failed to discover the slightest difference between it and the gamboge of commerce. It serves equally well to colour drawings; the Burmese priests often use it to colour their garments, and the Karens to dye their thread. It is also used by the native doctors in medicine, but I

think not extensively. Dr. Lindley, in his new work, the *Vegetable Kingdom*, says, "The best gamboge comes in the form of pipes from Siam, and this is conjectured to be the produce of *Garcinia Cochinchinensis*. As *G. elliptica* is spread over all the Province of Magui, is it not probable that it extends into Siam, and that the Siamese gamboge is the produce, a part at least, of this tree?"

There are several other species of *Garcinia* indigenous to the Provinces, but I know of no others producing any thing resembling gamboge, except *G. Cambogia*; the exudation of which, though it will not dissolve in water, dissolves in spirits of turpentine, and forms a very beautiful yellow varnish, for tin and other metallic surfaces.—*Pharm. Journ.*

ART. XXXIV.—THE PROBABLE ACTION OF CHLORINE AS A DISINFECTANT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—Had not the paper read by Mr. Smith at our last meeting extended to so great a length, it was my wish to have put a question to the Members as to their opinion of the precise manner in which chlorine acts when it puts in check the spread of infectious miasms.

From all the authorities I have consulted on the subject, I merely gather in effect this statement, that chlorine enters into chemical union with the miasmatic substance, and changes the combination of its elements into compounds of lower organic type, or even into inorganic.

It is everywhere believed by chemists that the matter of infection is highly organized, and though not volatile, that

it may, like the pollen of flowers, remain mechanically suspended in the air. What then is the action which chlorine exerts over this subtle agent?

We are familiar with the effects of chlorine upon such compounds as phosphuretted, sulphuretted, and carburetted hydrogen, the chlorine from its superior affinity uniting with the hydrogen, and leaving the other combustibles to be either oxidized or precipitated in a simple state.

But these gases, though noxious, are not *infectious*, and as the evils in nature are to a greater or less degree self-mitigating, it is doubtful whether even these noxious gases, in the absence of better means, do not occasionally perform a service, not merely by warning us of the presence of more dangerous matter, but by spreading a gaseous mask over its influence. Surrounded by the products of fermentation of their own excretions, it is said that the inferior animals thrive amazingly, as is observable with pigs, and is instanced by the manner of feeding oxen, called "pitting" them. The odours of a cow-shed are also said to be decidedly beneficial to the human subject in a variety of cases. I am not desirous, however, by any means, of advocating a conservatism of the impure gases, but merely wish to remark, that to deodourize the air, is not necessarily the same thing as to disinfect it.

Chlorine can enter into union with a vast many organic bodies, modifying or completely changing their character; *e. g.* by substitution of the radical hydrogen of alcohol, or rather aldehyde, as in chloral, or when it stands in the stead of oxygen, as in the comparison of, anhydrous formic acid, $C_2H O_3$, and chloroform, $C_2H Cl_3$. And Mülder mentions a combination of chlorine with such a high compound as proteine, which it precipitates from its solution in the form of white flocculent, nearly insoluble particles, to which the name chloroproteic acid is given. But does chlorine enter into chemical union with those virulent substances it is said to have the power of disinfecting?

According to the most reasonable views, the matter of infection is not merely composed of highly organized atoms, but those atoms are in a transition state, in fact they are a *ferment*. Let us consider, then, what are the means by which we may modify or restrain fermentation. Among the most powerful agents for this purpose are sulphurous acid, salts of mercury, volatile, and particularly empyreumatic oils, most aromatic substances, tobacco smoke, vapour of roasting coffee, and last, but not least, chlorine, iodine, and bromine, to which may be added substances that are the result of fermentation, as alcohol, and possibly sulphuretted, phosphuretted, and carburetted hydrogen (?), carbonic acid and ammonia. In the "quick vinegar process" introduced into Germany by MM. Wageman and Schutzenbach, although a large quantity of alcohol may be wholly transformed into vinegar in less than thirty hours, the merest trace of wood-vinegar present during the fermentation, would entirely put a stop to the process. The complete immunity also from contagion enjoyed by several trades during the great plague of London, such as tobacconists, curriers, tallow chandlers, oilmen, and other oily or greasy businesses, is a well-known proof that many substances as well as chlorine have a very high power of resisting the action of infectious matter, or, in other words, of stopping its fermentation.

From all this it appears most probable that the action of chlorine is twofold; first, decomposing the noxious (not infectious) compounds of hydrogen; and, secondly, (the most important) suspending the fermentative ("catalytic") power of the organized, but perhaps inodorous material that produces infection. If this notion be correct, it would follow that any of the above-named substances would have their advantages as well as chlorine in the work of disinfection. For instance, camphor has long been supposed to have a charm of this sort about it, and probably the incense employed by the Jewish Church, according to their law,

and described by Cruden as a very rich perfume, had reference to sanitary as well as devotional intentions. The use of strong aromatic perfumes was always general in countries much exposed to infectious influence, as we read in the inspired poetry of David, "All thy garments smell of myrrh, aloes, and cassia;" and the practice of embalming the dead (as the etymology of the word imports) had much to do with balsamic and other odorous substances. I mention perfumes more particularly than the other "anticatalytic" agents, because, as a chlorine generator could not very conveniently be carried about the person, perfumes offer an agreeable, and, I suspect, in many cases an equally efficacious antidote with chlorine against the influences of infection.

I remain, sir, your obedient servant,

WILLIAM GALLARD.

ART. XXXV.—ON THE MANUFACTURE OF GAS.

By ANDREW URE, M. D., F. R. S.

To the Editor of the Pharmaceutical Journal.

THE observations made in your last number, under the head of "Improvements in the Manufacture of Gas," though correct in general, require certain modifications. The great fall in the price of the London gas cannot fairly be ascribed to any considerable recent improvements in the quality or quantity of gas produced from a ton of coals; but is almost entirely due to the economy of the fuel used in decomposing the coal. At one period, not only the whole coke of the decomposed coal in the retorts was expended in

fuel, but also a good deal of fresh coal. By successive improvements, however, in mounting and managing the retorts, our gas companies have finally succeeded in effecting the production of their gas, by the expenditure of from one-third to one-fourth of the coke; thus reserving for sale from two-thirds to three-fourths of the whole. The main source of profit to the companies at present proceeds, therefore, from the sale of their coke, so that they may, with as much propriety, be styled manufacturers of coke, as of gas.

You have properly animadverted on the little novelty in Mr. Palmer's patent, too little indeed to resist an action at law: but it is surprising that a person who has been so long tampering with gas as Mr. Palmer, should be apparently ignorant of the first principles on which the illuminating power of carburetted hydrogen depends. This subject was fully investigated by the illustrious French chemist, Berthollet, more than forty years ago.

The good gaseous products of the decomposition of coal in retorts are chiefly two, viz., carburetted hydrogen (of the same composition as coal-mine gas) and bi-carburetted hydrogen, called also olefiant gas. The latter contains twice as much carbon as the former, to which it owes its rich illuminating power. Well made coal gas, from good Newcastle coal, contains, in its crude state, from ten to eighteen per cent. of this superior gas; though a good deal of it is abstracted and lost in some gas-works by injudicious washing; for olefiant gas is soluble pretty largely in water.

Berthollet demonstrated, that if pure olefiant gas be transmitted through an ignited tube, it is partially decomposed with deposition of charcoal, and becomes a sub-carburetted hydrogen gas. In this way a bright burning gas may be so much impoverished of carbon, as to afford only a blue flame. Nothing, therefore, can be imagined more preposterous than Mr. Palmer's project of improving his manufacture of gas by transmitting it through ignited

tubes. The scheme has been repeatedly attempted by unscientific speculators in various forms, but has been sooner or later abandoned, after occasioning no little injury to the establishment.

Mr. Palmer's other project, of using cannel coal, is quite impracticable in London; first, from the high price of cannel coal here, and next, from the worthlessness of its coke. The thing has been tried, but was, for these reasons, soon given up. His proposed plan for abstracting sulphur is of a very problematic nature, and may be regarded as at least superfluous, for all the leading gas companies of the metropolis furnish gas well desulphuretted. In fact, Mr. Palmer's patent is merely a collection of the shreds and patches of worn-out projects—a motley group of make-shifts, under the cover of our anti-scientific legislation, which in no other but our own jobbing, law-laden country would be taken under patent protection.—*Pharm. Journ.*

ART. XXXVI.—ON THE PECULIAR CONSTITUENTS OF THE
FRUIT OF ANACARDIUM.

By Dr. STEDELER.

THE fruit known by the name of Cashew nuts and noix d'acajou, which appear to have formerly been officinal, but are now no longer met with in commerce, are derived from a tree which occurs in South America and the West Indies, the *Anacardium occidentale*, L., *Cassuvium occidentale*, Lam., which belongs to the family of the *Cassuvix* and to the *Enneandria monogynia* of the Linnæan system. They are kidney-shaped, and of a brownish-yellow, somewhat

variegated colour, by which they are easily distinguished from those nuts which are still frequently met with among druggists by the name of Eastern *Anacardium*; the latter are blackish-brown and cordate.

The nut incloses a kernel, which in taste exactly resembles sweet almonds, and contains a sweet fatty oil; the pericarp, which consists of two lamellæ about a line apart from each other, incloses in its intermediate cellular cavities a brown balsam-like substance, which is oily at the ordinary temperature, has a burning acrid taste, and produces inflammation of the skin.

The fruit of *Anacardium* were first examined by Cadet, who found in them gallic acid, and noticed the acidity of the substance contained in the pericarp; but he was not of opinion that it could be employed with success in medicine. They were subsequently examined by De Mattos, who found in the shells, besides the acrid body, which he calls resin, a large quantity of gallic acid, tannin, an extractive substance, a gum-resin, (*gomme d'acajou*) and a green colouring principle. His attention was especially directed to the medicinal action of this resin, but he extolled its properties so extravagantly, that it was apparently soon forgotten. He employed it both externally as a vesicative, and inwardly in doses of 2 grs. as a drastic, and in doses of from a quarter to half a grain as a gentle stimulant. Similar results were obtained by two French physicians, MM. Eindrall and Bully.

To obtain this body, the nuts, freed from the kernels and crushed, were exhausted with ether as long as this removed anything, the ether distilled from the clear solution, and the residue repeatedly washed with water to remove a small quantity of tannic acid which was mixed with it. In this manner a reddish-brown liquid was obtained, which possessed scarcely any smell, and resembled Peruvian balsam; it formed about one-third the weight of the shells. At the ordinary temperature it is of an oily consistence, is very

easily dissolved by ether and by alcohol, and the solutions strongly redden blue litmus-paper. No volatile product was obtained on distilling it with water. When treated with dilute acids, it parts with a small quantity of ammonia. On spontaneous evaporation of the ethereal or alcoholic solution at a low temperature, the residue solidifies to a tissue of ramified crystals of a white colour, from which a reddish oily liquid separates.

It produces upon the tongue at first an astringent taste, and then a burning and reddening. To ascertain its effects upon the skin, I made the following experiment :—A spot of about one square inch upon the lower part of the breast was spread over with the balsam, and a piece of blotting-paper, which had been moistened with it, placed over it. In the course of a quarter of an hour a slight burning was perceptible, which rapidly increased, and appeared to have attained its greatest energy in about half an hour. The skin beneath the paper had become whitish, surrounded by a red circle. As the inflammation ceased and no further inconvenience was felt, the paper was allowed to remain for about three hours. The skin was covered with small vesicles, which increased considerably in size during the night, without however attaining to the size of those usually produced by cantharides plaster. The place was dressed with linen smeared with tallow ; it not only healed very slowly, but the after-effects appeared to continue for a very long time ; and after an abundant secretion of pus, the wound was from ten to fourteen days in healing.

A second experiment, made with balsam which had been treated with dilute muriatic acid, afforded the same result.

The muriatic extract left on evaporation crystals, which on examination proved to be chloride of ammonium. Since the balsam which had been treated with muriatic acid contained no more nitrogen, it is evident that its effects cannot be ascribed to any nitrogenous organic compound ; they are owing to a substance which is oily even at a low

temperature, and forms about 10 per cent. of the mixture, the greater part of which consists of a crystalline substance which has no effect upon the skin. This latter body belongs to the fatty acids, but it is not combined either with the oxide of lipyle or any other body occupying its place. I propose for this fatty acid the name of *anacardic acid*, and for the active constituent that of *cardol*. The balsam, moreover, contains a small quantity of some colouring substances, which appear to result from the decomposition of the cardol, and will be treated of when that substance is described.

Anacardic acid.—To separate the anacardic acid from the cardol, the mixture, extracted with ether and washed with water, is dissolved in from 15 to 20 parts of alcohol, and the solution digested with recently precipitated hydrated oxide of lead, which combines with the acid and the products of decomposition of cardol, which also appear to possess acid properties; the liquid loses its reaction upon blue test-paper and retains the cardol in solution. The precipitate is collected on a filter, and washed with strong alcohol until the drops falling into water no longer produce any turbidness. The lead salt is then mixed with water, decomposed with sulphuret of ammonium, and the solution of anacardate of ammonia decanted from the sediment of sulphuret of lead. The latter is washed once or twice with a little water, and the united liquids decomposed with dilute sulphuric acid, when the anarcadic acid separates in soft adherent masses, which soon solidify in the cold. They are repeatedly washed by decantation with cold water and dissolved in alcohol, when in general a little sulphur and sulphuret of lead remain. The moderately concentrated solution, which is still coloured, is mixed with water until a slight permanent turbidness is perceptible, upon which it is heated to boiling, and basic acetate of lead added by drops to it until the colouring substance, along with a considerable quantity of anacardic acid, subsides in the form of

dark oily drops. In the course of twelve hours the liquid is clear and nearly colourless; it is decanted and the residue exhausted with alcohol, which leaves a nearly black lead compound behind, soluble in ether. The alcoholic extract is of a red colour; it is again mixed with water until the appearance of slight opacity, and treated while boiling with basic acetate of lead as before, when dark drops of resin subside. The clear liquid is united to that previously obtained, and the residue, if it appear worth while, treated in the manner described. To remove the last traces of colour, the liquids are boiled for a short time with recently precipitated carbonate of baryta, when in the course of twelve hours a brown stratum is deposited upon the baryta, and the solution of the anacardic acid is perfectly colourless. Carbonate of baryta does not exert this decolourizing property before the treatment with basic acetate of lead.

The clear solution of the anacardic acid is now mixed with strong alcohol, and while boiling precipitated with a neutral alcoholic solution of acetate of lead. The addition of alcohol is requisite to facilitate the washing, as otherwise, instead of forming a white powder, the precipitate is flocculent. This, after washing, is suspended in alcohol, and decomposed with sulphuric acid or sulphuretted hydrogen, when, after removing the alcohol by distillation and mixing with water, the anacardic acid separates as an oily liquid, and as soon as the last traces of alcohol have evaporated spontaneously, solidifies to a crystalline mass. The acid separated with sulphuretted hydrogen crystallizes with greater difficulty, and moreover a peculiar disagreeable odour adheres to it, which even accompanies it in some of the salts, on which account the separation with sulphuric acid deserves the preference.

Anacardic acid forms a white crystalline mass, which melts at 79° F., and is some time before it returns to the crystalline state. It is void of smell, and has a faint aromatic burning taste, but does not blister the skin. It may

be heated to 302° without affording condensible products; but even at 212° it evolves a peculiar odour, without however experiencing any perceptible alteration in weight. At 392° it is decomposed into a very mobile, oily, colourless liquid, which was not further examined. It burns with a bright smoky flame, and produces a greasy stain upon paper. It is heavier than water. On long exposure to the air it deliquesces, and diffuses an odour perfectly similar to a rancid fat; and this occurs more rapidly with the acid separated by sulphuretted hydrogen than with that prepared with sulphuric acid. It dissolves readily in ether and alcohol, and the solutions strongly redden blue litmus-paper.

The crystallized acid afforded on analysis the following results:—

Carbon	75.06	75.02	75.07	44 =	75.04
Hydrogen,	9.17	9.19	9.19	32	9.07
Oxygen	15.77	15.79	15.74	7	15.89

From the analyses of the lead and baryta salts it was evident that 2 atoms of water may be replaced by bases; the formula of the anhydrous acid is consequently $C^{44}H^{30}O_5$, and its atomic weight 4179.68; that of the crystallized acid $C^{44}H^{30}O_5 + 2HO$, and its atomic weight 4404.64.

It forms with bases partly crystalline and partly amorphous, compounds in definite proportions; the neutral salts contain 2 atoms of base; in many salts however only 1 atom of water is exchanged for a base; it has therefore a great tendency to form acid salts.—*Chem. Gaz.*

ART. XXXVII.—CONTRIBUTIONS TO THE CHEMISTRY OF THE VARIETIES OF THE CATECHU.

BY PROF. DELFFS.

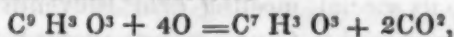
ALONG with the Bengal catechu, which forms dark reddish-brown cakes scattered over, with the husks of rice, there now occurs pretty frequently in commerce, the so-called Bombay catechu, in large irregular pieces of a uniform blackish-brown colour and fatty lustre, and which contain leaves of a species of palm disseminated through their mass. As both kinds are derived from *Acacia Catechu*, the difference between them must be owing to the mode of treating them on evaporation; perhaps the last kind has been somewhat burned. The catechu in square pieces has been rejected by the Prussian and also by the Baden Pharmacopœia, as an artificial product, consisting of clay and some astringent extract, while it has been admitted by the Hamburg Pharmacopœia. The author has never been able to discover any considerable amount of alumina in it; moreover the same kind still occurs in commerce, only that the squares are caked together; but it agrees with the old article in its lower specific gravity, ready friability, and sparing solubility in water.

When Bengal catechu is treated in a displacement-apparatus with ordinary ether containing water, and the liquid which passes (which does not separate into two layers, as with galls,) is evaporated under the air-pump, a thick yellow syrup is obtained, and subsequently a brittle, yellowish, shining, amorphous mass of catechu-tannic acid, which tenaciously retains a little of the ether. It readily absorbs so much moisture from the air as to deliquesce into a yellow syrup. Its aqueous solution yields with bichromate of potash a considerable brown precipitate, which does not dissolve in muriatic acid. The alkaline salts of the

catechu-tannic acid exhibit the same high degree of variability as the corresponding compounds of querci-tannic acid. If an aqueous solution of catechu-tannic acid be exposed to the air in a shallow vessel, decomposition very soon ensues, with the separation of a voluminous fibro-crystalline silky mass, or small acicular needles, which may be obtained perfectly colourless by allowing the hot aqueous solution to cool under the air-pump, and pressing the separated mass between filtering paper. The substance thus obtained is catechuic acid, and exhibits in its behaviour, so great an analogy to gallic acid, that the name catechine may be dispensed with. The composition of the acid is still not accurately determined, as the analyses hitherto made, differ considerably from one another. The substance employed by the author for analysis was dried *in vacuo* over sulphuric acid, and burnt with chromate of lead. It yielded

Carbon,	. . .	54.16	54.29	7 =	53.846
Hydrogen,	. . .	5.29	5.57	4	5.128
Oxygen,	. . .	40.55	40.14	4	41.026

As the salts of catechuic acid are very variable, the determination of the atomic weight does not lead to any certain result. Hagen obtained from the lead compound 62.19 per cent. oxide of lead, which corresponds tolerably well to the formula $C^7 H^3 O^3 + HO$. The formula $C^9 H^4 O^4$ may be deduced from Pelouze's analysis of catechu-tannic acid; we should have therefore



as in the formation of gallic acid from tannic acid.

The so-called Gambia extract yields when pounded but very little to cold water, and appears to be very poor in tannin. It dissolves for the greater part in hot water, and congeals on cooling, to a dirty yellow pasty mass, which behaves exactly like catechuic acid. It is therefore very probable that both drugs are derived from the same plant.

Chem. Gaz., from Journ. für Prakt. Pharm.

ABSTRACT FROM THE MINUTES OF THE PHILADELPHIA
COLLEGE OF PHARMACY.

At a Stated Meeting of the Philadelphia College of Pharmacy, held at their hall, Third month, 27th, 1848. Present seventeen members.

CHARLES ELLIS, 1st Vice President in the Chair.

Since the last meeting of the College, there has been elected by the Board of Trustees, the following gentlemen:

Joseph M. Turner, Savannah, Geo.; Peter V. Coppuck, Mount Holly, N. J.; J. C. C. Hughes, Pottsville, Pa., Associate members.

Alfred B. Taylor, Philadelphia city, Resident member.

The committee on adulteration of drugs, &c., made the following report, which, with the circular published by them, and a letter from Joseph R. Ingersoll, M. C., was read, and the committee continued.

To the Philadelphia College of Pharmacy.

The committee appointed to take into consideration, the adulteration of drugs, respectfully report,

That in accordance with the recommendation of the college, at its special meeting held Eleventh month 1st, 1847, the memorial to Congress then adopted was printed, duly signed by the officers of the college, and forwarded to both branches of the National Legislature, through Joseph R. Ingersoll in the lower House, and Daniel Sturgeon in the Senate. They have received an answer from Joseph R. Ingersoll in relation to the memorial, which informs that he has taken the steps necessary to secure the action of Congress.

The committee further state that they forwarded to each of the chief incorporated medical societies and institutions in

the United States, a circular, and a copy of the memorial, asking their co-operation in bringing about this desirable result.

The Committee not being yet prepared to report in reference to the "directions for detecting adulterations," ask to be continued.

DANIEL B. SMITH,
AMBROSE SMITH,
THOMAS P. JAMES,
EDWARD PARRISH,
CHARLES ELLIS,
JOSEPH CARSON,
WILLIAM PROCTER, Jr.,
Committee.

Third month, 27, 1848.

The Committee appointed on the outstanding debts of members, made the following report, which was accepted, and the Committee continued, to pursue the object of their appointment.

To the Philadelphia College of Pharmacy.

The Committee appointed to assist the Treasurer in the settlement of accounts of delinquent members, report,

That of the eleven members of the College who were in arrears for annual contributions, of some years standing, and whose accounts were placed in their hands for collection, seven have been settled with by a compromise, the committee being induced by circumstances to receive about half the amount due; and four remain unsettled, with only one of whom there is any prospect of coming to terms.

The Committee would call attention to the existing rules of the College on this subject, and would suggest for consideration, whether any further action is necessary in relation to members removing from the city, or retiring from business, whose annual contributions are neglected until they amount to a sum which it is difficult for the College

to collect; and also, whether in the case of delinquent members residing in the city, the contributions should be collected by process of law, or should be compromised by the Treasurer, according to circumstances.

Which is respectfully submitted.

E. PARRISH,

SAMUEL F. TROTH,

Committee.

The Committee on Latin Labels reported progress in the sale of the last edition, and were further continued.

The Committee on Patent Medicine Directions, verbally reported progress, and were further continued. They have purchased and liquidated two shares of the Loan, from the profits of the concern since their appointment.

The Committee on the Cabinet of Specimens, made a report which was read and adopted. In accordance with the suggestion therein contained, a committee consisting of Charles Ellis, Samuel F. Troth, Edward Parrish, John C. Allen, and Professors Carson, Procter, and Bridges was appointed. The sum of fifty dollars was also appropriated to their use.

To the Philadelphia College of Pharmacy.

The Committee appointed at the last meeting, relative to establishing a cabinet, &c., report.

That they have given attention to the subject, by calling on members of the College who are manufacturers, druggists, &c., and found them willing to contribute toward the collection of such products or drugs as the committee may select, the amount of the donation being at the option of the donor. The committee believe from the liberal manner in which their application has been received, that the work will progress rapidly after the proper action has been extended by the College, at least in reference to substances in common use. In regard to the cases for the reception of the specimens, it is proposed to locate them in the Library

room, on the east side, to correspond as near as may be with the book cases, in height and style, and constructed in sections extending from the door to the south wall.

The reasons for proposing this location, are that the specimens will be convenient for examination at our scientific meetings; that they will be ornamental rather than not, to the room itself, and especially, because the absence of day light from the room for the chief portion of the time, will tend greatly to the preservation of the specimens of vegetable origin.

It is proposed that all substances at all perishable by exposure, and especially those which will not require to be removed from the containing vessel, be placed in glass bottles or jars, capable of being securely stopped; that others may be kept in earthen jars, also protected from the air, and as few as possible be placed in a manner exposed to the atmospheric changes.

As the object is a permanent collection, worthy of the College, it should be placed under the superintendence of the Standing Committee on the cabinet and apparatus, who should be required to report annually to the March meeting of the College, in a well digested form, suitable for publication in the minutes; giving the condition of the collection, the donations received, and recommending such action as they may deem important to its advantage.

The Committee therefore recommend that a committee of four members, including the three professors, be appointed to carry out the design, with authority to draw on the Treasurer for fifty dollars, and report at the next meeting.

DANIEL B. SMITH,
CHARLES ELLIS,
WILLIAM PROCTER, JR.,
JOSEPH CARSON,
ROBERT BRIDGES,
Committee.

The Board of Trustees submitted some proposed rules for the government of professional conduct, which were read and referred to an adjourned meeting of the College, to be held on the evening of 31st inst.

A report was submitted by the Publishing Committee, which was read and accepted.

During the past year the Committee have received for subscriptions, &c., \$1034.80, and expended during the same period, \$688.61, including \$50 paid by order of the College to the Finance Committee, leaving a balance in favour of the Journal, of \$346.23.

This being the usual time for electing officers of the institution, Wm. J. Jenks, and D. S. Jones, were appointed tellers, who reported that the following named members had received a majority of votes, whereupon they were declared duly elected.

President.

Daniel B. Smith.

1st Vice President.

Charles Ellis.

2d Vice President.

Samuel F. Troth.

Secretary.

Dillwyn Parrish.

Treasurer.

Joseph C. Turnpenny.

Corresponding Secretary.

William Hodgson, Jr.

Trustees.

Warder Morris,
Joseph Carson,
Robert Bridges,
Wm. Procter, jr.,

John H. Ecky,
Edward Parrish,
Wm. P. Troth,
Benj. R. Smith.

Publishing Committee.

Robert Bridges,
Wm. Procter, jr.,
Charles Ellis.

Daniel B. Smith,
Edward Parrish,

Then adjourned till 31st inst.

At an Adjourned Meeting of the College, held at the Hall on the evening of Third month, 31st, 1848. Present twenty-four members.

The President in the Chair.

The Code of Ethics referred from the last meeting, was again taken up, read by paragraphs, and after a discussion in which sundry amendments were made, was unanimously adopted.

Some conversation ensued upon subjects embraced in the Code of Ethics, more particularly in relation to the improper use of anodynes and stimulants, and the duty of apothecaries and physicians in endeavouring to check the evil, and also the importance of a correct phraseology, and more precision in the writing of physicians' prescriptions.

On motion it was ordered, that the Code of Ethics just adopted, be signed by the officers of the College, and published in the Journal of Pharmacy, and that a committee be appointed to transmit a copy to the College of Physicians and other incorporated medical bodies in this city, and take such other measures for its circulation as they may deem expedient, and that said committee be authorized to communicate with the College of Physicians on other matters connected with the interests of both professions.

The following members were appointed on the committee; Daniel B. Smith, Henry C. Blair, Dillwyn Parrish, William Procter, Jr., Samuel F. Troth, Dr. Joseph Carson, and Thomas P. James.

Then adjourned.

Extracted from the Minutes,

DILLWYN PARRISH, Secretary.

A CODE OF ETHICS ADOPTED BY THE PHILADELPHIA
COLLEGE OF PHARMACY.

Pharmacy being a profession which demands knowledge, skill, and integrity on the part of those engaged in it, and being associated with the medical profession in the responsible duties of preserving the public health, and dispensing the useful though often dangerous agents adapted to the cure of disease, its members should be united on some general principles to be observed in their several relations to each other, to the medical profession, and to the public.

The *Philadelphia College of Pharmacy* being a permanent, incorporated institution, embracing amongst its members a large number of respectable and well educated apothecaries, has erected a standard of scientific attainments, which there is a growing disposition on the part of candidates for the profession to reach; and being desirous, that in relation to professional conduct and probity, there should be a corresponding disposition to advance, its members have agreed upon the following principles for the government of their conduct :

1st. *The College of Physicians of Philadelphia* having declared that any connection with, or monied interest in apothecaries' stores, on the part of physicians, should be discountenanced; *we in like manner consider* that an apothecary being engaged in furthering the interests of any particular physician, to the prejudice of other reputable members of the medical profession, or allowing any physician a percentage or commission on his prescriptions, as unjust toward that profession and injurious to the public.

2d. As the diagnosis and treatment of disease belongs to the province of a distinct profession, and as a pharmaceutical education does not qualify the graduate for these responsible offices: we should, where it is practicable, refer applicants for medical aid to a regular physician.

3d. As the practice of Pharmacy can only become uniform, by an open and candid intercourse being kept up between apothecaries, which will lead them to discountenance the use of secret formulæ, and promote the general use and knowledge of good practice, and as this College considers that any discovery which is useful in alleviating human suffering, or in restoring the diseased to health, should be made public for the good of humanity and the general advancement of the healing art,—no member of this College should originate or prepare a medicine, the composition of which is concealed from other members, or from regular physicians.

Whilst the College does not at present feel authorized to require its members to abandon the sale of secret or quack medicines, they earnestly recommend the propriety of discouraging their employment, when called upon for an opinion as to their merits.

4th. The apothecary should be remunerated by the public for his knowledge and skill, and in his charges should be regulated by the time consumed in preparation, as well as by the value of the article sold; although location and other circumstances necessarily affect the rate of charges at different establishments, no apothecary should intentionally undersell his neighbours with a view to their injury.

5th. As medical men occasionally commit errors in the phraseology of their prescriptions, which may or may not involve ill consequences to the patient if dispensed, and be injurious to the character of the practitioner; it is held to be the duty of the apothecary, in such cases, to have the corrections made, if possible, without the knowledge of the patient, so that the physician may be screened from censure. When the errors are of such a character as not to be apparent, without the knowledge of circumstances beyond the reach of the apothecary, we hold him to be blameless in case of ill consequences, the prescription being

his guarantee, the original of which should always be retained by the apothecary.

6th. Apothecaries are likewise liable to commit errors in compounding prescriptions,—*first*, from the imperfect handwriting of the physician ; *secondly*, owing to the various synonyms of drugs in use, and their imperfect abbreviation; *thirdly*, from the confusion which even in the best regulated establishments may sometimes occur, arising from press of business ; and *fourthly*, from deficient knowledge or ability of one or more of the assistants in the shop, or of the proprietor—

We hold that in the first three instances named, it is the duty of the physician to stand between the apothecary and the patient, as far as possible ; and in the last that he should be governed by the circumstances of the case—drawing a distinction between an error made by a younger assistant accidentally engaged, and a case of culpable ignorance or carelessness in the superior.

7th. As the apothecary should be able to distinguish between good and bad drugs, in most cases, and as the substitution of a weak or inert drug for an active one, may, negatively, be productive of serious consequences—we hold that the intentional sale of impure drugs or medicines, from motives of competition, or desire of gain, when pure articles of the same kind may be obtained, is *highly culpable*, and and that it is the duty of every honest apothecary or druggist to expose all such fraudulent acts as may come to his knowledge. But in reference to those drugs which cannot be obtained in a state of purity, he should, as occasion offers, keep physicians informed of their quality, that they may be governed accordingly.

8th. As there are many powerful substances that rank as poisons, which are constantly kept by apothecaries, and prescribed by physicians, and which are only safe in their hands, as arsenious acid, vegetable alkaloids, ergot, cantha-

rides, etc.—we hold that the apothecary is not justified in vending these powerful agents indiscriminately to persons unqualified to administer them, and that a prescription should always be required, except in those cases when the poisons are intended for the destruction of animals or vermin—and in these instances only with the guarantee of a responsible person. And we hold that when there is good reason to believe that the purchaser is habitually using opiates or stimulants to excess, every conscientious apothecary should discourage such practice.

9th. No apprentice to the business of apothecary should be taken for a less term than four years, unless he has already served a portion of that time in an establishment of good character. Apprentices should invariably be entered as matriculants in the school of pharmacy, and commence attendance on its lectures at least two years before the expiration of their term of apprenticeship; and as the progress of our profession in the scale of scientific attainment must depend mainly upon those who are yet to enter it—it is recommended that those applicants who have had the advantage of a good preliminary education, including the Latin-language, should be preferred.

DANIEL B. SMITH, *President.*

CHARLES ELLIS, *1st Vice President.*

SAMUEL F. TROTH, *2d Vice President.*

Attest, DILLWYN PARRISH, *Secretary.*

COMMENCEMENT.

At the Commencement of the Philadelphia College of Pharmacy, held on the evening of the 4th inst., the degree of *Graduate of Pharmacy* was conferred by the President of the College on the following gentlemen, pupils of this institution, viz :

G. Graves Loudon	thesis on Hydro-Alcoholic Extracts.
T. Curtis C. Hughes	" Uva Ursi.
John R. Lewis	" Podophyllum Peltatum.
Alfred Lafayette Taylor	" { Ung. Hydrarg. Oxid. Rub. et Ung. Gallæ.
Alfred K. Scholl	" Helianthemum Canadense.
N. Spencer Thomas	" Emplastrum Plumbi.
Charles Bullock	" Kalmia Latifolia.
Samuel Lenher	" Gentiana Purpurea.
Charles S. Rush	" Displacement.
Evan T. Ellis	" Extract of Valerian.
James H. Crew	" Apocynum Androsæmifolium.
John R. Andrews	" Leontodon Taraxacum.
Charles A. Santos	" { Euonymus Atropurpureus et Americanus.
Charles M. Wilkins	" Coptis Trifolia.
George T. Wiggan	" Cephalanthus Occidentalis.
John A. Springer	" Eupatorium Perfoliatum.
Charles M. Cornell	" Kino.
Franklin C Hill	" { Pharmacy and Medicine in their relations to each other.
James Laws, Jr.	" Syrups.
Samuel M. Bines	" Lactucarium.
Edmund Pollitt	" Eupatorium Perfoliatum.

The Valedictory Address was delivered by William Procter, Jr., Professor of Pharmacy.

Extracted from the Minutes,

EDWARD PARRISH, Secretary.

MISCELLANY.

Gymnema Sylvestre, an Indian plant, which, when chewed, destroys the power of tasting Sugar.—At a meeting of the Linnæan Society, on Tuesday, December 7th, Dr. Falconer made a communication which he had received from Captain Edgeworth, who was located in the northern part of India. Captain Edgeworth, an acute observer, and one who is actively engaged in prosecuting the study of botany, hearing from the natives that a plant grew in that neighbourhood, which, if chewed, would destroy the power of the tongue to appreciate the taste of sugar, and all saccharine substances, at first thought this an extremely problematical and fanciful statement; but knowing the natives of India to be remarkable for their powers of observation, there being scarcely a plant in the country to which they did not attribute some property, fanciful, but more generally real, he was determined to try the effect of the plant in question. The name of the plant is *Gymnema sylvestre*; nat. ord. *Asclepiadææ*, a native of the plains in the north of India. It has a greenish flower, and thick fleshy leaves, and like most of the plants of this order, it produces a milky juice. Captain Edgeworth chewed some of the leaves, and was surprised at not perceiving the acrid taste of the plants of this order; but about two hours afterwards, when taking some tea, he was greatly surprised to find that although he could fully appreciate the aroma of the tea, he was perfectly unable to appreciate the taste of the sugar. Thinking this to be a very strange circumstance, he obtained some preserves and other substances containing sugar, and upon putting them upon the tongue, he found he was still unable to appreciate the saccharine quality; he then obtained some powdered sugar, and it appeared only like so much sand in his mouth. This effect lasted altogether nearly twenty-four hours, when he recovered the power of tasting sugar. To avoid all chance of error, Mrs. Edgeworth afterwards tried the effect of the plant, and with precisely the same result. Dr. Falconer considered this effect to be an extremely curious one, and he believed that it was the only well authenticated case upon record of such an effect being produced upon the organ of taste, that although it was well known that many substances have the power of

preventing the eye distinguishing certain colours, but none that had the power of destroying the sense of taste for any one particular substance, while it could appreciate others, and might, consequently, lead to some important physiological discovery as regards the organ of taste.—*Phar. Jour.*

On the effect of Coffee in diminishing the bitter taste of Sulphate of Quinine.
By M. QUEVENNE.—Sulphate of quinine is less soluble in an infusion of coffee than in water: this is evidently the cause to which the property possessed by the former liquid, of masking the bitterness of the quinine, must be referred. Besides this the part remaining undissolved at the bottom of the vessel absorbs certain elements of the coffee (amongst others tannin and colouring matter), and becomes still less soluble, not only in an infusion of coffee, but also in pure water. With respect to the practical inferences to be drawn from these observations in a Pharmaceutical point of view, it may be remarked that, besides the necessity already pointed out by M. Dorvault (*Répertoire de Pharmacie*, t. 3, Juin, 1847), of not dissolving the salt of quinine previously in acidulated water, but of putting it in powder in the infusion of coffee, and taking it whilst in a state of suspension, it is better that the coffee should not be very warm when the sulphate of quinine is added, the solvent power of the liquid, and, consequently, the development of the bitter taste, increasing with the temperature. The coffee should not be employed too strong, as that would increase the tendency to the formation of tannate of quinine—a salt less soluble, and, consequently, less active than the sulphate. Nine grains of sulphate of quinine, added to an infusion of two and-a-half drachms of coffee, in three ounces of water, with sugar *ad libitum*, are suitable proportions.

As regards the effect produced on the activity of the sulphate of quinine when thus mixed with coffee, these observations would naturally lead us to inquire how far this diminution of solubility could injure the effect of the medicine. It is evident that, starting with this general principle, uncontrovertible both in physiology and chemistry, that the activity of bodies is increased in proportion as they are dissolved, or readily acted on by the liquids with which they come in contact; and remarking, on the other hand, what has been proved by experiment, that sulphate of quinine, dissolved in acidulated water, acts more promptly and energetically than when in a state of partial solution in pure water, or in pills, we must arrive at the conclusion that the manner of administration, of which we are now treating, is disadvantageous. But, at the same time, sulphate of quinine, being a

medicine almost invariably very decided in its action, we believe, that, in the majority of cases, notwithstanding the disadvantages resulting from its diminished solubility, this discovery will prove useful to invalids, by enabling them to take what to some is a disagreeable medicine, without perceiving the taste. Still, it is right that the physician should be acquainted with these disadvantages, that in obstinate cases he might either increase a little the dose, or rather have recourse to a more favourable mode of administration, namely, solution in acidulated water.—*Ibid, from Jour. de Phar.*

On the Preparation of Infusions and Decoctions in Prussia.—The sixth edition of the Prussian Pharmacopœia, directs all extracts and volatile oils, and most of the ointments and plasters, to be prepared by means of a steam apparatus or water-bath.

With regard to this the Prussian Government has recently issued the following regulations :

As the object of the above directions is to obtain more uniform and effective infusions and decoctions, Apothecaries are required to provide themselves with the necessary steam apparatus, and to proceed in the preparation of decoctions, decocto-infusions, and infusions, in the following manner :

The tin or porcelain vessels for decoctions must be so constructed that at least three-fourths of their height may be exposed to steam, which must possess the temperature of boiling water. Part of the vessel may be in direct contact with the boiling water. If the steam be generated in a boiler, its temperature must never be so high as to heat the liquid contained in the vessel to a boiling temperature. The vessels must be furnished with lids of the same material and fitting close.

The same quantity of the substance as prescribed by the Physician, broken or cut into small pieces, is stirred in the decoction vessel with as much cold water as is known by experience to be required for obtaining the prescribed quantity of liquid, and the vessel being well closed, is to be exposed for half-an-hour to the influence of steam, during which time the vessel is to be well shaken several times, and the contents immediately filtered whilst hot. If some other substance is to be added towards the end of the operation, this must be done after the vessel has been exposed to the steam for twenty-five minutes.

Decocto-infusions are prepared by adding to the hot contents of the vessels, the substance to be infused after the decoction has been exposed to the steam for the prescribed time, stirring carefully, closing the vessel, and allowing it to become perfectly cold, after which the contents are to be filtered.

The infusions are prepared in the usual way: boiling water is poured over the well-broken or cut substance, the contents of the vessel stirred up, the latter closed, the liquid allowed to become perfectly cold, and then filtered.

If the Apothecary wishes to employ for the infusions, water which has been heated in a kettle to a boiling temperature by the steam of the apparatus, the vessel must be exposed to the steam for five minutes.

If the quantity of the medicine, and that of the liquid to be obtained from it, are not prescribed by the physician (which ought only to occur in extraordinary cases) one drachm of the substance is taken for every ounce of the decoction or infusion. In order to obtain a *concentrated decoction*, the vessel is to be left for three quarters of an hour to the influence of the steam; and for a *very concentrated decoction*, one hour, without increasing the quantity of the medicine. A *concentrated infusion* is prepared by increasing the substance to be infused by one-half of the prescribed quantity, and a *very concentrated infusion* by doubling it.—*Ibid*, from *Buchner's Repertorium*.

On Oleum Ricini Alcoholicum.—M. August Ostermayer a merchant in Munich, has received from Trieste, and offers for sale a sort of oleum ricini alcoholicum, which is much patronised in Italy. From half-ounce to one ounce, according to the age and constitution of the patient, is prescribed with half-an-ounce of *aqua naphæ*, and half-ounce of *syrup. cort. aurant*. This oil is said to be less disagreeable to the taste in this form and mixture, and also to operate more effectively than the common ol. ricini obtained by pressure, or boiling with water.

Dr. Buchner gives the following description of it:—the ol. ricini alcohol. is of a very pale yellow oil colour, and somewhat turbid. When left standing, white flakes and some small globules form in it, and which appear to arise from the presence of water. The specific weight is only 0.920, that of common castor oil, according to Brandes, Schübler, and others, being 0.954 to 0.970. It is clear and somewhat thick. The ol. ric. alcohol. possesses a faint smell of alcohol, altogether void of fuselol [oil of grain]; and a not disagreeable oily and alcoholic taste. If taken without syrup and *aqua cort. aurant*. it leaves behind in the throat a slight, rather persistent acrid sensation. The alcohol which it contains is not very strong, but it can easily be ignited, and then it burns with a blueish flame, leaving some particles of water mixed with the oil. To determine the proportion of castor oil, six drachms, or 360 grains of *ol. ricin. alcohol*. were submitted to a temperature of from 167° F. to 212° F., in a porcelain capsule for 48

hours. The residual oil weighed 259 grains, and possessed the same colour and consistency as genuine *ol. ricini*, only after being swallowed it left the above mentioned acrid sensation in the throat. The result of this experiment is, that the *ol. ricini* alcohol. contains 72 per cent. of common castor oil, including the drastic part of the latter, and 28 per cent. of alcohol and water.

M. Buchner, who supposes this oil to be an alcoholic extract from castor seeds, made the following experiment: 142 grains of perfectly ripe seeds were carefully peeled, and yielded 98 grains, or 69.01 per cent. of kernels, and 44 grains, or 30.99 per cent. peels. The first were triturated into a paste, and digested with about two drachms of spirit of wine at 90 per cent, at a gentle heat. The oleo-alcoholic extract being removed from the sediment, was much like the *ol. ricini* alcohol., but paler, and at the same time of a stronger alcoholic taste, which shows that the Italian oil is prepared with a weaker spirit. It was accompanied with the same acrid sensation as the Italian oil. The residue was afterwards distilled twice with larger quantities of alcohol of the same strength, and at last with ether. The exhausted bran dried at 212° Fahr., formed a yellowish white powder, having a mealy taste, and weighed 33.5 grains; the employed seeds, weighed with their shells, yielded accordingly 35.5 per cent. oil, 33.5 per cent. bran, and 31.0 per cent. shells.

Geiger says, he found in castor seeds, besides 46.19 per cent. oil (which also possessed an acrid taste) *fecula* (*amylon*?) together with gum and albumen. Buchner, however, convinced himself that the residue freed from oil, consists for the greater part, of *emulsin*, is not coloured blue by iodine, and contains, therefore, no starch, but sugar; for a very diluted *emulsio ricini* when mixed with washed yeast, undergoes the alcoholic fermentation at a low temperature.—*Ibid*, from *Buchner's Repertorium*.

The Brazil-Nut Tree.—The one of all these most attractive was that which produces the Brazil-nut, called in the country *castanhas*. Botanically it is the *Bertholletia excelsa*. This tree was upwards of 100 feet in height, and between two and three in diameter. From the branches were depending the fruits, large as cocoa-nuts. The shell of these is nearly half an inch in thickness, and contains the triangular nuts, so nicely packed, that once removed no skill can replace them. It is no easy matter to break this tough covering, requiring some instrument and the exercise of considerable strength; yet we were assured by an intelligent friend at the Barra of the Rio Negro that the *Guaribas*, or howling monkeys, are in the habit of breaking them by striking them

upon stones or the limbs of iron-like trees. This friend related an amusing incident of which he had been witness, where the monkey, forgetful of every thing else, pounding down the nut with might and main, in a fervor of excitement, struck it with tremendous force upon the tip of his tail. Down dropped the nut and away flew monkey, bounding and howling fearfully. How long the victim was laid up by his lame tail our friend was unable to inform us; but we thought one thing certain, that monkeys had changed since Goldsmith's day, inasmuch as at that time, as we are informed, the tip of a monkey's tail was so remote from the centre of circulation as to be destitute of feeling. When the castanha-nuts are fresh they much resemble in taste the cocoa-nut, and the white milk, easily expressed, is no bad substitute for milk in coffee. This soon becomes rancid, and at last turns to oil. The nuts are exported largely from Pará, and are said to form a very important ingredient in the manufacture of sperm candles.—*Voyage up the Amazon.*

On the Presence of Alumina in Plants. By PRINCE SALM-HORSTMAR.—Much doubt has lately been thrown on the presence of alumina in plants. Berzelius, however, asserts that it is present in *Lycopodium complanatum* and *Helleborus niger*. This induced the author to investigate its occurrence in these and some other plants.

Some *Lycopodium complanatum*, which had been collected in February, was boiled with distilled water for half an hour, the filtrate evaporated in a platinum dish, the yellow gummy residue incinerated, the ash dissolved in muriatic acid, evaporated to dryness, again dissolved in muriatic acid, filtered, the filtrate treated with muriate of ammonia, then with pure ammonia, the precipitate dissolved in a small quantity of muriatic acid, digested with solution of potash in excess in the platinum dish, and filtered. The filtrate yielded a precipitate of alumina, on the addition of muriate of ammonia.

0.35 grm. of the ash of the green parts of this *Lycopodium* were treated with muriatic acid, no effervescence occurred; the solution was evaporated to dryness in the platinum capsule, and the mass well moistened with muriatic acid; after standing some time it was dissolved in water, filtered, the filtrate treated first with muriate of ammonia, then pure ammonia, the precipitate washed, removed from the filter while moist and dissolved in muriatic acid, treated with excess of caustic potash in a platinum capsule, digested with heat, when the greater part dissolved, it was filtered, the filtrate treated with silicate of potash, and heated to ebullition in a glass vessel, the washed precipitate dissolved while moist in muriatic acid, evaporated to dryness in platinum until the odour of chlorine had disappeared, thoroughly moistened with muriatic acid, treated with water, the

silica separated by filtration, and the filtrate precipitated with carbonate of ammonia; the precipitate, when well washed and heated to redness, weighed 0.135 grm., and consisted of alumina; hence the ash contains 38.5 per cent. of alumina. It acquired a beautiful blue colour when treated before the blowpipe with a solution of nitrate of cobalt.

This ash contained, moreover, 16 per cent. of silica soluble in potash, and only 6 per cent. of lime. The other constituents were magnesia, potash, soda, manganese, iron, phosphoric acid and sulphuric acid, which were not accurately determined. The aqueous solution was not alkaline in reaction. This lycopodium grew upon a yellow, aluminous, sandy heath, which contained only a trace of humus.

0.35 grm. of the ash of *Juniperus communis*, which was growing close to the lycopodium, was tested for silica. The ash was prepared from the summits of the shoots, which were thickly covered with needles. Alumina was decidedly present, but the quantity did not amount to a milligramme. It contained only 2.5 per cent. of silica, but 28.5 per cent. of lime.

Moreover, in 0.5 grm. of the ash of *Erica vulgaris*, which also grew close to the *Lycopodium complanatum*, a small but appreciable quantity of alumina was present with 17 per cent. of silica soluble in solution of potash. The delicate summits of the shoots covered with leaves were the only parts used for this examination.

Alumina was also found in the leaves of *Helleborus niger*, which had grown in a garden soil abounding in humus.

The leaves of the *Pinus sylvestris* contained no trace of the alumina. The tree grew upon a rich sandy soil.

Hence there is no doubt that certain plants contain alumina.

The remarkable circumstance, that the ash of *Lycopodium complanatum* contains more than 38 per cent. of alumina, *Juniperus communis*, growing close to it, a mere trace, whilst many plants, according to recent analyses, contain none, appears to justify the conclusion that the roots of plants containing alumina either exert a peculiar catalytic power upon the aluminous compounds with which they are in contact, or excrete an acid; for were the aluminous constituents of the soil soluble *per se* in the fluids of the soil, they would also be absorbed by other plants.

This consideration induced the author to test the reaction of the roots of *Lycopodium* and *Juniperus*; and he found that the perfectly fresh uninjured smaller roots of *Lycopodium complanatum*, free from the soil, when placed upon moistened litmus-paper, had an acid reaction, whilst the root of *Juniperus communis* did not exert this action.—*Chem. Gaz., from the Journ. für prakt. Chem.*

On some Properties of Carbon. By M. LAZOWSKI.—The properties of carbon are numerous; they have been partly studied, but every day produces new facts: when it is in a state of ignition, it possesses some very remarkable properties.

When a piece of ignited charcoal, which is very clean and free from ash, is immersed in a solution of a metallic salt, it reduces the metallic salt which is contained in it, and the metal itself is deposited with all its natural brilliancy on the piece of charcoal. Thus the salts of tin, copper, platina, palladium, mercury, silver and gold, &c., furnish most brilliant deposits.

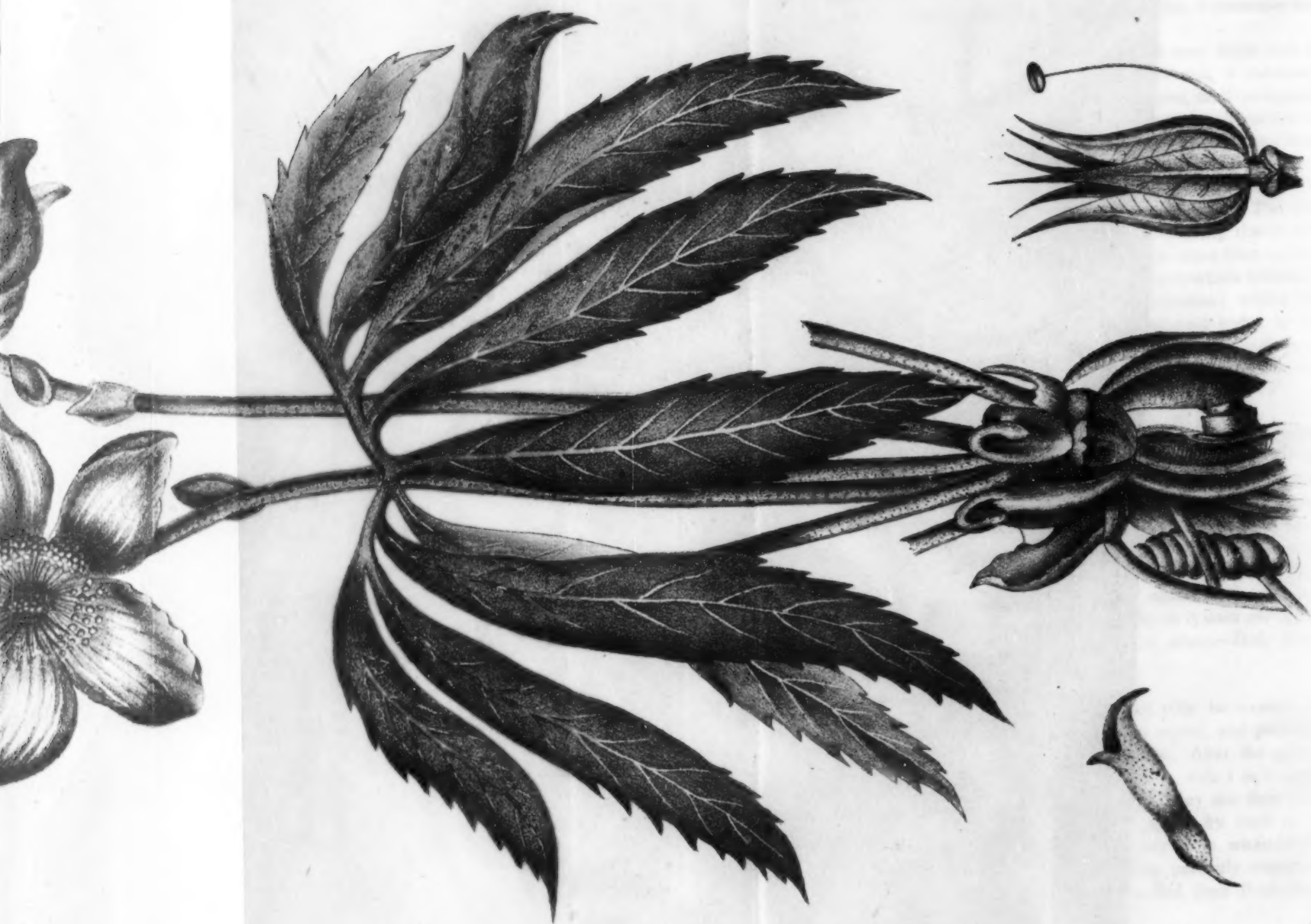
M. Lazowski has remarked, he says, that when the salts are too acid or too much concentrated, no effect is produced. The dilute solutions of the salts of copper often yield, by covering the charcoal, the most varied shades of colour, from the finest azure blue to that of metallic copper. The parts of the charcoal upon which certain metals are deposited in preference, are the extremities; whilst other metals cover equally all the surface of the reducing body; at other times, and this occurs with the protochloride of tin, the metal appears in very brilliant crystals, disseminated on the periphery of the charcoal.—*Ibid*, from the *Jour. de Chim. Méd.*

Action of Potash upon Amber. By. G. REICH.—When powdered amber is heated to boiling in a retort with a very concentrated aqueous solution of caustic potash, and distilled to dryness, a strong odour of camphor is disengaged, and the receiver contains an aqueous liquid, together with a white substance which possesses all the properties of camphor (stearoptene). This substance must however not be confounded with the succinic camphor of M. Vogel, which is obtained by the destructive distillation of amber, and which has absolutely nothing in common with camphor, as it does not dissolve in water nor in alcohol, and very sparingly in ether.—*Ibid*, from the *Archiv. der Pharm.*

Candied Pills.—Dorvault recommends that pills be coated with gum, by which means they acquire a candied aspect, and present the same advantages as the gilt pills did formerly. After the pills are rolled, they are to be shaken in a spherical box with 1 or 2 drops of simple syrup, so as to render them moist. They are then mixed gradually by shaking with powdered gum, either by itself or with oleo-saccharum, until they cease to take up any more, when they are dried. If it be required to render the coating perfectly transparent, some starch is added to the powdered gum.—*Ibid*, from *Buch. Rep.*







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